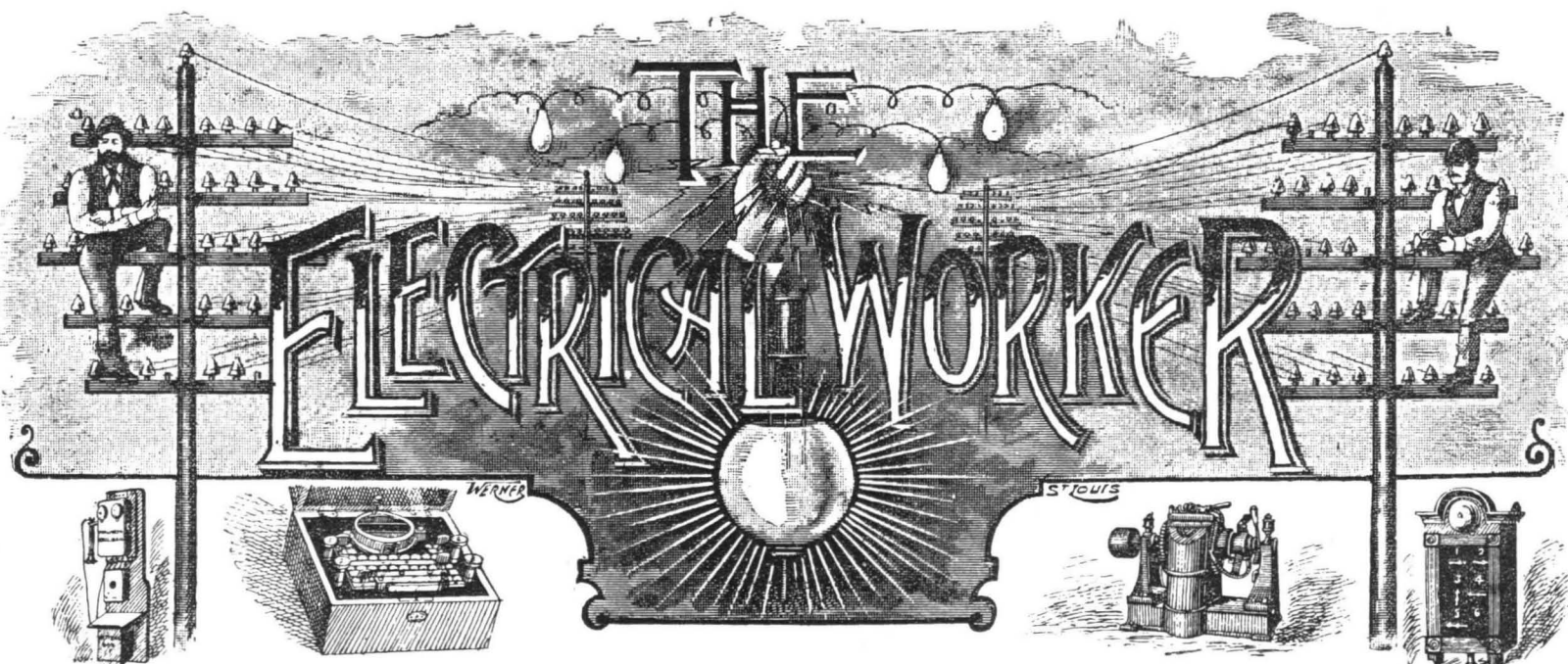


FEB 1893 P.1



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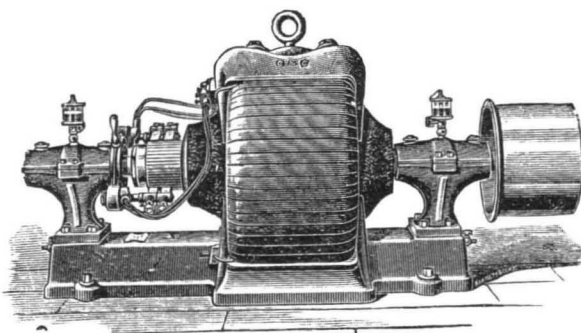
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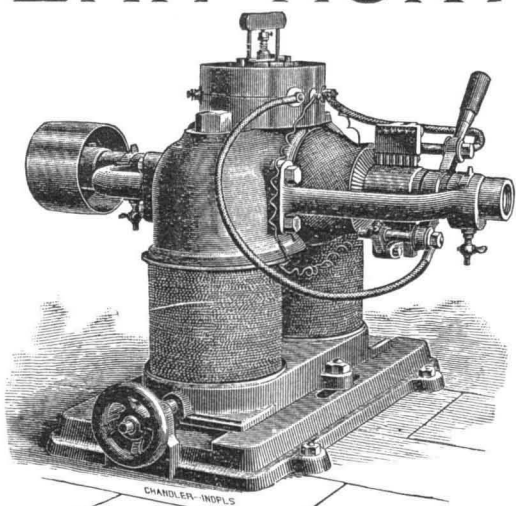
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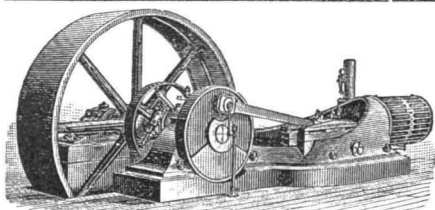
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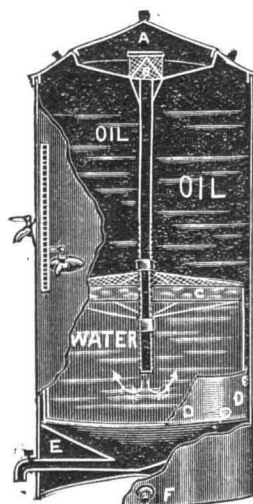
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Second Annual Convention of the National Brotherhood of Electrical Workers.

FEB 1893

Probabilities as to the Success of Distribution of Power at Considerable Distances by High Tension Currents of Electricity.

BY E. CARL BREITHAUP.

The problem of the transmission of power involves two distinct cases: (1) Distribution in small quantities over limited areas, as *e. g.*, central station distribution. (2) Transmission of energy in large units over considerable distances, as where a large power supply is available, but at an otherwise inaccessible place. Under this head again two cases may arise—where all the energy is to be delivered at one place, and where considerable quantities are to be delivered at each of several places.

Of the purely mechanical methods of transmitting power that of belts and shafts is no doubt the best for very short distance. Long lines of shafting, however, present some difficulty both in construction and operation.

For greater distances wire rope is often used with good results, the best example of which is the case of cable railways. According to Beringer's table, the efficiency of this method drops from 93 per cent at 500 metres (about one-third of a mile) to 13 per cent at 20,000 metres (12.4 miles). At a recent cable railway test at which the writer assisted we found that altogether the road was operated quite economically. Where traffic is heavy, the system is undoubtedly a good one.

Transmission by compressed air distributed through pipes is available for greater distances. The efficiency of such a system varies from 55 per cent at 500 metres to 40 per cent at 20,000 metres, and can be increased about 20 per cent if the air be heated.

Transmission by steam distributed through pipes and by hydraulic means may also be mentioned as among the purely mechanical methods, but their application is very limited; where gas is cheap the gas engine can be used to good advantage.

The problem of distribution over a limited area is in general best solved by electric methods, and of these the most successful is that of distribution by direct current at constant pressure. The dynamos and motors of this class, shunt and compound wound usually have an efficiency of over 90 per cent (*i. e.*, the larger sizes), and the loss on the line can easily be made quite small, so that we may reasonably expect to have over 75 per cent of the mechanical horse power delivered to the dynamo for actual use at the motor pulley. Moreover, the cost of such a plant is not really so high as with any of purely mechanical means and a pressure can be used which is perfectly safe. Any system of long distance of transmission to be successful must, of course, deliver power at the receiving end cheaper than it can there be produced. This practically limits the case of long distance work to cheap sources and large units. Its principal factors then are: 1. Primary cost. 2. Working expense. 3. Safety.

In electrical transmission we have at present three different methods, viz.: 1. By means of direct currents either at constant potential or constant current. 2. By means of simple alternating currents. 3. By means of the three phase alternating so-called rotary current. In any case, unless we can thereby effect a corresponding reduction in the working expense, coupled with a fair degree of safety, the cost of our plant must be reasonably low; this means that the machinery must be as simple as possible; further, it should consist of the fewest possible number of inter-dependent parts, so as to reduce the liability of a breakdown to a minimum, and it should not be liable to get out of order.

In all these respects, as in many others, the direct current system so far has the advantage, and we are inclined to think that very many if not most of the cases arising in ordinary practice can be best dealt with by this method. The maximum poten-

tial difference we can safely use on an armature is probably 2,000-3,000 volts, though some engineers claim it can be carried as high as 5,000 volts. Take *e. g.*, a case where a good steady water supply of 100 to 150 h. p. is available at a distance of, say, 5 miles, and where we can afford to allow a loss of 20 percent on the line. Using a 100-h. p., 2000 volt generator, the required diameter of the line on a complete metallic circuit would be only slightly over two-tenths of an inch, about No. 4 B. & S. gauge. With an efficiency of 90 per cent in the machines we should still have 64 h. p. available at the motor pulley. Taking the cost of the machinery as \$30 per h. p., copper as 20 cents per pound, poles as \$4.50 set, and allowing 35 poles per mile, the first cost of our plant would sum up to \$127 per h. p. delivered.

For distances where a high pressure is required, it has been proposed to use a number of dynamos coupled in series and an equal number of motors also in series at the receiving end. The scheme has, we believe, been tried in France, where one of the difficulties encountered was that in case of a break in the circuit the machines were invariably burnt out. A Swiss firm has submitted plans on this system for carrying 800 h. p. from Niagara Falls to Chicago. They propose to use ten machines of 100 h. p. and 3000 volts, each making a total initial pressure of 30,000 volts, and allow a loss of 24.5 per cent on the line. Counting on an efficiency of 90 per cent in the machines the plant would have a total efficiency of 60 per cent. The motors at the receiving end would drive dynamos which in turn would supply current at any desired potential difference. Taking the distance as 500 miles, we find that to get the results above stated we should require a wire having a diameter of about .37 inch (about No. 00 B. & S. gauge) for a complete metallic circuit. The total weight of copper would thus be something over 1,063 tons.

Alternating currents furnish a ready solution of many of the difficulties in the problem of power transmission, but as yet we are in the position of the man of whom the German proverb says, he had the soup but not a spoon. We can generate at low voltage, transform by means of stationary apparatus, which requires no further attention, to a high voltage, thus be transmitted over the line and again reduced to any desired potential difference at the other end. The method involves more interdependent parts, and the first cost of such a plant is generally somewhat higher than where continuous currents are used. Further, for alternating currents the practical resistance of a wire is not the same as for continuous currents, since periodicity and self-induction must now also be considered. It is no longer a constant quantity, whatever the current, and to do the same work we may, and often do, require a wire of greater cross-section. Again, the E. M. F. now varies periodically between zero and a certain maximum; the effective E. M. F. is therefore only a mean, and we must insulate against a greater voltage than that indicated.

Whether it be advisable to use step-up and step-down transformers will depend on distance and the line loss we can allow. In every case the cost of transformers must be balanced against the additional cost of copper which they save.

The ordinary motor for simple alternating currents has the great drawback that it will not start itself. When running it must be kept in perfect synchronism with the generator supplying it, the result of which is that when overloaded it comes to a dead halt, sometimes with disastrous results. The only way it can be used is, therefore, to start it by some independent means and bring it up to the required speed before we turn on the current; the load can only be applied after this has been done. In cases where only one motor is to be supplied from the line, and the load is a constant one, the system can be used to advantage. A notable example, and the only one of which we know, is the mining plant at Telluride, Colo.,

installed by the Westinghouse company. A potential difference of 3,000 volts is used, and 120 h. p. are transmitted $2\frac{3}{4}$ miles at an efficiency of 75 per cent. This plant, we believe, is doing its work well, its total primary cost is given at \$100 per horse power delivered.

Mr. Tesla, some years ago, brought out a new form of alternate current motor which has, however, as yet, not been put to practical use. The principle involved is quite simple. Take *e. g.*, a four-pole machine and excite the field by means of two separate alternating currents, opposite poles being wound on the same circuit. If we give to these currents a phase difference of 90 degrees, they will produce a resultant magnetic field which will rotate with the same periodicity as that of the exciting currents. Mr. Stanley has lately devised a motor on which he uses a condenser to neutralize the effects of self-induction, and also a method by which he claims the Tesla motor can be used on any simple alternate current circuit. Still another new form is that of the Ganz.

As to the merits of the tri-phase alternating current, it possesses the same advantages as the simple alternating current in that it can easily be changed to any desired voltage by step-up and step-down transformers. The system received its first great trial at the Frankfort Electrical Exhibition in the summer of 1891, when the energy of a water-fall was transmitted from Lauffen to Frankfort, a distance of 108 miles. The underlying principle is the same as that of the Tesla motor.

The first named type of tri-phase motors, like the synchronous, simple alternating motor, must harmonize in phase with the generator; it is, therefore, not necessarily self starting, though it will start with the generator. Its fields must be excited by continuous currents. The second type will start itself, even under heavy load, and of course requires no separate field excitation; its speed is also fairly constant under variations of load. With this motor the tri-phase system should be quite as commercial for central station distribution as the continuous current. Moreover, by means of specially designated motor-dynamos, it can be transformed into continuous currents of any desired voltage. We could thus transmit energy from a large and otherwise inaccessible source over a considerable distance and supply current either alternating or continuous at any desired potential difference and for any desired purpose.

Summing up then: Of the different systems now in use for the transmission of energy, in cases of any considerable distance the electrical methods make undoubtedly a better showing in point of efficiency than any of the purely mechanical methods and they have also much the advantage in first cost. So soon as the distance exceeds a few miles the low tension current of course drops out of consideration. For moderate distances, not over six to eight miles, we think continuous current apparatus will generally be found the most suitable. If we want to supply a number of large motors, each with varying load, the problem will be difficult, but it will be so in any case. For long distance the tri-phase current is, we think, at present the most suitable and there are many instances where large water powers now going to waste could thus be utilized.

Electric Stamping Machines.

The electrical stamping machines, which have been adopted in so many post office departments, are capable of effectively stamping 30,000 letters in an hour. The letters are placed upon their edges in a horizontal hopper, and carried, one at a time, between two feed rollers. After the first separation is thus effected a second set of feeding rollers carry on the envelope to the inking rollers, where each letter is stamped singly, and then passed on to the stacking table. A register shows the number of envelopes canceled. The date and hour in the die must be changed by hand. The various rollers are run by belts, passing over different sized pulleys, which are in turn connected by gearing to the axle of the actuating motor.

FEB 1893

Underground Construction.

BY W. A. TOWER.

It is only within the last seven years that underground conduits for electrical purposes have been constructed to any extent, although as early as 1808 Soemering, a Russian scientist, exploded mines electrically through an underground wire a mile long, and in 1837 Cooke and Wheatstone operated the first practical telegraph system in the world by means of underground wires.

The first work of burying wires in America was done in Washington, D. C., but I believe the system did not work satisfactory, and is to be, or has been, remodeled. The next work of any importance was done in Chicago, where they adopted the drawing-in system, the only practical system for telephone work at the present time.

This system does not necessitate the use of any particular material or make of conduit, of which there are a great many. The principal ones are: 1st, iron pipe, 2d, cement-lined iron pipe, and 3d, the Wyckoff.

In building an iron pipe conduit, after trench has been dug, a layer of concrete about three inches thick is laid, wide enough to allow an inch or more between each pipe, and three inches on each side. A row of pipes is then laid, the pipe lengths varying from 10 to 22 feet, and are screwed together by regular threaded couplings. After this is done concrete is put on, filling up the spaces between the pipes and three inches on each side. The concrete is then leveled off about one inch above the pipe. Another row of pipe is then put down, and the process repeated until the proper number of ducts has been laid. The top layer of the pipe is then covered with three inches or more of concrete, and the trench filled in.

The cement-lined pipe comes in lengths of about 8 feet with beveled male and female ends, and is laid in the same way as the iron pipe. The joints are made by bringing male and female ends together, and covering the junction with neat cement.

The Wyckoff conduit consists of pieces of thoroughly creosoted wood, about 8 feet 4 inches long, 4½ inches in diameter, with a three-inch hole through the centre, the ends counter-bored and tenoned. There is first laid an inch-and-a-half board in the bottom of the trench, which is wide enough to hold the proper number of ducts. The ducts are then laid on this, layer by layer, the joints being made by joining the male and female ends about half the length of the tenon, when hot pitch is poured in, and the lengths then driven together. After the ducts are all laid, a 1½-inch board is placed on top to protect the ducts from the picks of workmen digging across the line of the conduit.

This all appears very simple to those who have had no experience with this work, but some of the difficulties which have to be overcome are by no means trifling. In the first place, after deciding upon the route to be followed, it is necessary to find out whether there is room enough on the street to lay the conduit. The engineer or superintendent of construction applies to the city and gas company for the location of their mains, which information, as a rule, is given very graciously, but in three out of five cases the position given is not correct within two or three feet, and about the only use made of the information is to tell on which side of the street the mains are, and, consequently, test holes have to be dug to locate the pipes before the work can be started. As a general rule the bottom of the conduit is put below the level of the gas mains, and when a corner is reached it is often necessary to carry part of the ducts over the mains, and part under them. The manholes are usually located at street intersections, and consist of chambers about 7 feet long, 5 feet wide, and 7 feet deep, with brick walls laid in cement, and a cast iron head and cover generally made to bolt down tight to keep out

water. After the conduit is laid and manholes built, an entrance must be obtained to the telephone building, which too often has been built without proper consideration for the handling of cables.

In pulling in cables, we first have to get a rope through the duct. This is done with wooden rods, about four feet long, equipped with malleable-iron couplings. The rods are handled quite easily, two men being able to rap 400 feet of conduit in about 15 minutes. The rope is fastened to an iron clevis, about 10 inches long, made to fit the cable, and riveted on to the end of it. The reel of cable being on a holder, the cable is then ready to pull in, which is done with a winch, geared to an upright shaft with a sliding drum, and so arranged that the drum can be placed exactly opposite the duct through which the cable is to be drawn, thereby avoiding pulling the cable around, or over any corners of the conduit.

After the cables are in the splicing has to be done. This operation requires the greatest of care, and only thoroughly reliable men should ever be employed to do this work. In making a splice, the cables from each way are bent into their proper places in the manhole, and then cut to the proper length, which allows the ends to lap about a foot. The lead is then stripped off each end the length of the lap, and a piece of lead pipe, large enough to cover the wires when spliced, is then slipped over one of the ends, the wires are separated in pairs and turned back as far as the lead is stripped.

Two pairs of the bottom wires—one from each end—are then taken, and the insulation stripped off, care being taken not to nick the wires. A paper sleeve is then put on one end of each wire, the wires twisted together, and the sleeve slipped back over the junction of the wires. After all the pairs are joined in this way, they are boiled out with hot paraffin, to vaporize any moisture that may have been absorbed while making the splice. A piece of paper is bound around all the wires to keep the paper sleeves in position; the lead sleeve is now pulled over the splice, and a regular plumber's joint wiped.

Before a splice is started the cable is tested back to the office, or to the point from which it starts for open and grounded wires; the length to be spliced on is also tested in the same way, and if any such wires are found they are spliced together, so that although there might be a faulty wire in every section of the cable there would still be only one bad wire from end to end. If the testing were not done, a faulty wire in one section might be spliced to a good wire in the next, and so on; in which case the more sections of cable the more faulty wires there would be in the entire length. After all the splices are made, and the pole or building terminal put on, the wires are tested out and put on corresponding binding posts at each end. A capacity and insulation test is made, and if it is up to the standard the cable is ready for use. At present the insulation must be at least 500 megohms per mile, and the capacity at most .08 microfarad per mile.

Telegraphing at Sea.

The telephete, or sea-telegraphing instrument, which has been placed at the disposal of the United States Government, and the working of which will be shown at the World's Fair, is well spoken of by experts who have examined it. The instrument consists of a series of wires and electrical connections operated by a keyboard, by which 106 incandescent lights are controlled and made to produce the signals of the Morse alphabet. The wires number over 5000, and occupy a space of only 11 by 12 inches. The dots of the telegraph characters are represented by two illuminated lamps, the spaces by twelve unilluminated, and dashes by twelve illuminated lamps. The inventor claims that 32 candle-power lamps can be seen at a distance of ten to fifteen miles.

Coating Carbons.

One of the greatest drawbacks to the use of the arc lamp has always been the large consumption of carbons caused by the intense heat, and a considerable increase in the cost of lighting was thereby caused. A method of treating carbons has lately been discovered which greatly lengthens the life of the carbon. It consists of coating the carbon tips with copper of about the same thickness as that usually employed, and then adding a heavier coating of zinc. The carbons thus treated are said to burn twice as long as those having merely the copper covering.

What is Electricity?

[By S. F. Walker, in the London "Electrical Engineer."]

The rapid advances that have been made during the past ten years, both in the practical application of electricity to the service of man and in the knowledge of the principles of the science, have brought us, in the writer's opinion, to the point at which we are obliged to ask ourselves, What is electricity? if the advance is to continue. Up till very recently, notwithstanding the wonderful guesses that have been made by those not actually engaged either in the study or the practice of electricity, and the closer and closer approximations that have been made by those mathematicians who have given attention to the subject, it may fairly be said that we knew absolutely nothing as to what the mighty force we dealt with was. And, in addition to this, it has not been necessary that we should know what electricity was, so long as we were thoroughly cognizant with what it could be made to do.

Prof. Oliver Lodge first aroused us from this peaceful state when he commenced his crusade against lightning conductors. Those of us who had studied the subject closely felt that Dr. Lodge was wrong, and we believe that in the battle at Bath we successfully defended our position, but it was only by making use of an argument that is always in the mouth of the old type of practical men, and which was therefore dangerously close to the feminine argument—it is because it is. We could not go further because we were lost, literally and metaphorically, immediately we got up in the clouds. What is a charged cloud? occurred to one again and again, and one was not satisfied with the old stereotyped answer that the cloud formed one plate of a condenser.

Since the battle at Bath, the writer of this article has been closely observing every circumstance that appeared to bear upon the question, and he has devoted a considerable amount of time to the purpose of thinking the matter out step by step, but it was not until after listening to the lecture delivered by Prof. Rücker before the British Association on "Electrical Stress," and after careful thought had enabled him to realize the full force of the experiments so ably conducted on that occasion, that the result, which he now ventures to state, dawned upon him. As far as the writer is able to understand the matter now, electricity is simply motion of the molecules of the different substances which are the subjects of electrical action, just as heat, light and sound are, and the only difference between these forces is the rate of the motion. The know of sound, as we all know, is comparatively slow; that of heat and light are very rapid. That of electricity would appear to be somewhat between the slow motion of sound and the rapid motion of the heat-waves, whose motion is slowest. And it would appear that the wonderful adaptability which electricity shows for every kind of work is due entirely to the position which its rate of motion occupies in the scale of the energies. It would also appear that the reason this wonderful agent laid dormant for so many ages, and is even now only partially developed, is very largely, at any rate, because we have no sense which responds to the particular periods of vibration comprised within the electrical range.

As already pointed out, Prof. Rucker's experiments showing clearly that the dielectric in an electric condenser is compressed by reason of the charge which is present at the surface of the condenser plates, puts the keystone to the arch which is built up of the principles of the science; but once the principle is accepted, it will be found that every electrical phenomena can be explained by its use, and that many phenomena that have hitherto appeared very puzzling become quite simple when interpreted by its aid. The limits of this article will not allow of illustrations being given, but the writer hopes to return to the subject again and will then go more fully into details. The writer's reason for referring to the evidence

afforded by Prof. Rücker's experiments as so conclusive is because this fact of the increased size or altered form of any body when subject to the strain of one of the other physical forces has always been, and justly so, the grand argument in favor of the principle that these other forces were merely forms of motion within the bodies themselves. One of the greatest difficulties, in fact, in approaching a subject of this kind is to train the mind to realize the invisible motion of the molecules of a body in each case. With sound, for instance, we may cause a bell or a tuning-fork to sound their proper notes, yet it is only by the application of special apparatus that we are able to show that these bodies are not only in motion, but actually change their form when emitting sound; so, too, with heat. It is exceedingly difficult for us to realize that an iron bar is in motion within itself, even when what we call cold, yet it is not difficult to prove that every substance alters its form under the influence of heat, expanding as heat is applied, contracting as heat is taken from it; and that the different states in which bodies exist—the solid, liquid and gaseous—are due to the different spaces required by the molecules in their vibrations, and, therefore, to the different rates of their vibrations. As in all these cases it has been shown that change of form, increase or decrease of the lineal dimensions of any body under the influence of sound, heat or light, can only be due to the increase or decrease of the rate and amplitude of the vibrations of the molecules of the body within itself, so the fact that the dielectric of an electric condenser is compressed when the condenser is charged can only be due to the increased dimensions of the condenser plates from the vibrations set up within the plates themselves by reason of what we know as the electrostatic charge. Electric currents, of course, are merely the communication of these motions from one body to another; those bodies such as the metals in which the molecules are more easily able to take up the motion forming what we call conductors, and those which do so with difficulty being insulators.

The writer will conclude this brief notice by remarking that heat currents would be far more efficient than electric currents if we could make use of them as we do the latter, and that, as he before remarked, the reason electricity is such a useful agent appears to be because its rate of vibration is sufficiently high to admit of rapid transmission, yet not sufficiently so to be destructive. It only becomes destructive when it is transformed into heat.

A New Electric Block System.

A new block system is about to be put in operation on the Pennsylvania Railroad. It is called the electro-pneumatic system of automatic block signaling. The present system, which depends upon operators at each signal station to telegraph back to the station next behind whether the tracks are clear, is not always to be trusted, as has been found in one or two recent accidents. On the other hand, say the engineers, electricity can always be depended upon. It never gets drunk or mixed up, it does not neglect its duty, and it has never been known to go to sleep on post. The worst that can be said of electricity is that the mechanism which it controls sometimes gets out of order. But in the system which has been adopted any break in the current or disarrangement of the mechanism shows a danger signal. So, whether or not the new system proves as effective as is hoped, the change is on the side of safety. At present the company is going to apply the new system to only ninety-one miles of its main line. Workmen are putting it in at each end of the New York division, a distance of ninety-one miles. If it works on the main line as successfully as it has worked on the Pittsburgh division, where it has been tested, the company will apply it to the entire road.

In the present signaling system the road is divided into sections or blocks varying from half a mile to four miles in length. At each junction of two blocks is a signal station. The operator in this station sets a danger signal against coming trains until he is informed by telegraph by the operator next ahead that the track between them is clear of trains. Then he sets an "all right" signal. Engineers are forbidden to pass from one block to that next ahead until the signal indicates that the block ahead is clear. The system would be practically perfect, barring fogs, if the operators in the station could be absolutely depended upon. In the new system electricity does the watching and compressed air does the signaling. The blocks are half a mile long. Each block has its own electrical batteries and other mechanism. The rails of each block, being the conductors of the electricity which controls the mechanism, are insulated at each end from the rails of adjoining blocks. A weak battery of only two cells is connected with the rails, the positive current entering one and the negative the other. This battery is at the upper end of the block. At the lower end, that which the approaching train reaches first, the circuit is completed through an electro magnet, into which wires enter from the rails. So long as there is no train on the block to connect the two rails, and thus short-circuit the current, the electro magnet remains charged and holds its armature fast to it. As soon as a train enters the block, however, the current is short-circuited through the wheels and axles, the electro magnet ceases to be charged and releases its armature. A second electric circuit operated by a more powerful battery is broken and closed by the movement back and forth of the armature of this electro magnet. This second electric circuit is so connected by mechanical devices with the compressed air system operating the semaphore signals that the signals are raised and lowered whenever the circuit is broken and closed by the movement of the armature. Suppose, first, that there is no train on the block. The weak electric current runs the length of the rails and completes its circuit through the electro magnet, which, thus charged, holds down the armature. The armature connects the positive and the negative poles of the electric current from the second battery, completing this second circuit.

The second current completed affects the compressed-air mechanism in such a way as to show an "all right" signal. The engineer of an approaching train sees the "all right" signal and knows that the block ahead of him is clear. The train then enters the block. The instant the wheels touch the rails the current from the weak battery is short-circuited then. The current ceases to pass through the electro magnet, and that being demagnetized releases the armature. The armature, on being released, immediately springs back, and the circuit from the second battery is broken. The breaking of this circuit instantly affects the compressed-air mechanism in such a way as to show a danger signal. As long as the train remains on the block this danger signal remains set. The instant it passes the next block the current from the weak battery resumes its course through the electro magnet, the circuit from the second battery is closed and the "all right" signal is set again.

By another device the next block ahead is also connected with the pneumatic apparatus so that two signals are shown at each station. A red arm stands for the block just in front and a green arm for the block just next to it. The engineer of an approaching train, if he sees both arms down, knows that the track is clear for two blocks ahead of him. If he sees the red arm down and the green arm raised, he knows that the block just ahead is clear, but that there is a train on the next block to it. The old system signals only the condition of the block the train is about to enter.

Another advantage of the system is that if a switch is turned or a rail broken the danger signal is set automatically.

The New Jersey Central Railroad and Harlem road are also experimenting with the new system. —*Globe-Democrat*.

Filaments For Incandescent Lamps.

A German electrical journal gives a description of a new method of preparing filaments for incandescent lamps in Germany, which, in the present transitional state of the incandescent lamp industry, is full of interest. The filament is constructed in three layers, of which the core is the actual carbon thread. It is soaked with a mineral gum, and is covered with a non-conducting sheath of silicate, which melts during the carbonization and serves not only to protect the filament from burning during the process and from the air, but also to give it a smooth surface, on which the third layer (which is necessary for the adjustment of the resistance), can be finely and evenly deposited. It is the usual practice to adjust the resistance of the filament after fixture in the bulb by heating in liquid or gas from which carbon can be deposited, but the currents set up by the heating hinder the process, owing to the contained oxygen acting on the depositing carbon and spoiling its quality. In the new process the filaments are heated in a bath of paraffin or naphthalen, or some similar hydrocarbon solid at ordinary temperature. Since only the particles in the immediate neighborhood of the filament become liquid, no appreciable convection currents are set up. The wooden, silk or cotton thread filament, after being steeped in a solution of 25 per cent to 30 per cent water glass, 10 per cent to 15 per cent Senegal gum and 12 per cent to 13 per cent caustic soda, is rolled and bent into the form of an angle-iron, this form having the advantage of possessing many sharp edges, which are more luminous than surfaces. The filament is then carbonized in the usual manner and placed in the paraffin bath, the paraffin solidifying around it; the necessary arrangements for measuring their resistance are made; the current is passed; and particles of carbon are deposited on the silicate sheath. When the filament attains the proper resistance the current is cut off, the belt of paraffin is melted and the filament removed; the particles of paraffin are cleared off by alcohol, and the filament is then ready to be fixed to the lamp. The method is said to possess the following advantages: The gum gives the filament great toughness and strength; the silicate sheath again strengthens it and forms an evenly constructed whole; the adjustment of the resistance is much easier, as paraffin is the most suitable hydrocarbon for the purpose of depositing carbon, while the solid bath prevents all access of air during the process.

Playing the Banjo by Electricity.

Those who hold that the introduction of electricity into every department of industrial and social life is apt to be overdone, would seem to have some ground for complaint now that an electric banjo has appeared in Boston. The instrument has electro-magnets so fitted as to press on the frets when energized, and a plucking arrangement acts on the strings. These actions are controlled by a moving strip of paper run by an electric motor, through guideways of a contact-maker, the paper being previously stamped out in dots and dashes corresponding to the tune. It may be doubted, however, whether the electric banjo will ever serve any practical purpose beyond being a monument of perverted ingenuity.

Arc Lights in Mid-Ocean.

A French company has again brought forward the question of lighting the Atlantic route from Ireland to Newfoundland. It is proposed to put ten powerful floating lights, 200 miles apart, and connect them by electric cables.

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MISSING

Our Thanks

Are due to the daily press of St. Louis for the very handsome manner in which they welcomed us to the journalistic ranks. Each and every one of them gave us a kindly greeting and had a few words of encouragement. Their action was a great contrast to the sullen silence which was universally observed by the electrical papers, to each and all of whom we mailed a sample copy. They did not even notice our advent among them. They may have considered beneath their collegiate dignity to grasp the digits of a horny-handed son of toil, or more probably their masters, the great monopolizing electric companies (by whom they are subsidized or owned, body and soul) forbade them to give us a kindly greeting. This will not interfere with our digestion, however, nor will it sour the lacteal fluid of human kindness in our disposition. In their despite we will still wax and grow fat and in our March issue will discard our swaddling and long clothes and appear in a neat, quiet, gray quakerish covering befitting our modest demeanor and expectations. We refer our *classic* friends to Byron's farewell to Moore and as their memories are probably as short as their bank accounts we quote these lines for their benefit:

"Here's a *sigh* for those that love me,
Here's a *smile* for those that hate;
And whatever sky's above me,
Here's a *heart* for every fate."

Just as we are going to press we are in receipt of the unwelcome intelligence that the General Electric Co. (The Edison Electric Trust), have won their suit against the Beacon Vacuum Pump & Electric Co. of Boston. This virtually gives the Edison Trust the monopoly of manufacturing incandescent lamps for at least a time, but the case will be carried to the Supreme Court and the decision may be reversed. The Columbia Incandescent Lamp Co. of St. Louis, are cited to appear before the U. S. Courts here by the General Electric Co., to show cause why they should not be restrained from manufacturing lamps, but Prest. Rhotchaniel claims to have much stronger evidence against the Edison patents than the Beacon Co. had, and proposes to fight it to the bitter end. We hope this will not be a repetition of the telephone suits, and that the control of the manufacturing of the familiar little glow lamps will not pass permanently into the hands of one monopoly, thus retarding the progress of domestic electric lighting.

ADVICE FROM OUR PRESIDENT.

National Brotherhood of Electrical Workers, Greeting:

FRIENDS AND BRETHREN:—I am proud of the fact that we now have a journal of our own, and no amount of credit given our Secretary would in any measure express my appreciation of his work.

A man from our own ranks, a brother of our lodge, elected by his brethren to a position of trust and responsibility, was the first to take upon himself the duties of an editor.

Editor of a paper, not a common, every-day sheet, but a scientific, instructive educator of electrical workers. How well he filled his position you have seen in the first issue of the journal. Therefore I believe it my duty, as President of the National Brotherhood of Electrical Workers, to express my sincere thanks, with the firm belief that the Brotherhood throughout the United States will also recognize the worth of him who has given his time and ideas for our benefit. I hope that every union belonging to the Brotherhood will express their appreciation of our grand Secretary-Treasurer and editor of the ELECTRICAL WORKER. There is one thing I would like to impress upon every member of our organization: that our journal is neither a political nor religious paper. Its chief, and in fact only, mission is to educate the members of the Brotherhood and to uphold the rights of electrical workers. Many grievances have come under my notice, such as political and other differences, interfering with our great work of elevating and ennobling our members. I am sorry to say that even religion has been brought into our camp. This should not be. The National Brotherhood of Electrical Workers gives perfect freedom to all its members in their political and religious beliefs and does not lean to any one political faction nor religious creed. Any movement to introduce politics, religion or other extraneous matter into our unions is simply to cause discord in our ranks and is the work of malevolent individuals who join our Brotherhood and intend to "rule or ruin." Therefore I say, brethren, beware of such traitors and sit down promptly and resolutely on any and all motions, resolutions, etc., that are foreign to the constitution of the N. B. E. W.

The electrical companies and works are just beginning to appreciate the Brotherhood. The fact that the electrical workers have to serve an apprenticeship of three years is a guarantee that a member of the organization is a skilled and intelligent workman—one that uses his head as well as his hands. The members are more apt to teach each other all the points and tricks of the trade and will learn quicker from each other than from strangers who are afraid the newcomer may soon know more than himself and supersede him.

Employers have found out that where all their employes are members of the same organization there is less bickerings and jealousies and things run smoother.

Fellow-craftsmen, in conclusion I would say: It is impossible to send an organizer to every place, and I believe it entirely unnecessary. I would remind the brethren of the fact that each one of them is an organizer of the Brotherhood. Wherever you may be by all means try to get your fellow workmen to join the organization. Also get as many subscribers and advertisers for the ELECTRICAL WORKER as possible. Always recollect that by aiding the Brotherhood you aid yourselves. To some of our high-toned

Advertising Rates on Application.

We again call the attention of our press secretaries to their trade reports. The electrical industry is not overcrowded. There may be more men in some localities than are needed, but there is always a demand for men somewhere. We have a large number of men who take pleasure in traveling, and it is our aim, with the aid of our correspondents, to keep all members thoroughly posted on the condition of work, so that when they desire to make a change, or when out of work, they may know where to look for it. It often happens that a number of men will come to a city where there are already a number out of work. This has a demoralizing effect on wages, and could be avoided if the men were properly directed.

THE officers of a Local Union should be very particular about admitting strangers to the meeting, and should adhere strictly to Art. XVI., Sec 5 of the constitution, which covers this matter.

It must give a great deal of satisfaction to the stockholders and others who were driven to bankruptcy by the Bell Telephone Co., to know that in a short time the field will again be open to all comers. The old stockholders of the Pan-Electric Telephone Co. of St. Louis, held a meeting and propose to go actively into the telephone business early in the spring. With three companies in the field—The Bell, The New Telephone and Telegraph Service Co. and The Pan-Electric Co.,—the "hello" customer can pay his money and take his choice. The more the merrier, we say; so come on with your new companies, gentleman, as soon as possible. We have plenty of good, true and capable men in our ranks that can teach you practical telephoning from Alpha to Omega.

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THE ELECTRICAL WORKER.

ST. LOUIS'S PIONEER ELECTRIC LIGHT.

Tony Faust the First to Use the Electric Arc Light in St. Louis Then and Now.

While in Paris in 1878 Mr. Tony Faust was so much dazzled by the electric arc lights then just coming into use there that he decided to have a plant of his own on his return to this city. With him to decide was to act. He purchased a Gramme dynamo and a supply of 5000 arc light candles, and Messrs. Jungenfeldt & Heisler did the fitting up. As electric engineers and experts were not as plentiful then as now the plant was not a glittering success, and after a short experiment it was discontinued and Faust was some \$5000 out of pocket.

This was Heisler's first acquaintance with electric lights but he was such an apt student that he soon mastered the science and last year retired from active business as a half-millionaire.

Electrical business lay dormant till 1884 and then started up with a boom that has been increasing ever since till, at present writing, St. Louis can almost claim the title of the "Electric City." Its electric light and railway systems are the wonder and admiration of all visitors.

The plant of the Municipal Electric Lighting & Power Co. has a 6000 arc light capacity of which over 4000 are in actual use and has besides 10,000 incandescent lights. The Municipal is said to have the largest electric plant in the world. Missouri Company has some 70,000 incandescent lights in use and claims to have the largest alternating station in the world. The Laclede Gas-Light Co.'s plant at Mound street and Levee furnishes 10,000 incandescent lights besides many more in alleys and public buildings north of Washington avenue. The St. Louis Electric Lighting & Power Co. (Guernsey-Scudder) last year put up a plant that furnishes 150 arc lights. The Laclede Power Co. is one of the largest exclusively electric power companies in the world. Besides these large plants there are many private ones and others are in course of completion.

St. Louis claims to have the best and largest electric street railway plants in the country, probably her only rival being Boston. For less than a decade and a half's work this is pretty fair showing and an increase at same ratio during the next decade will certainly sustain her claim to the title of the "Electric City."

A New Telephone Company in St. Louis.

The Telephone and Telegraph Service Company is the name of a new telephone company lately organized in this city, and from present indications, if current rumors can be relied on, it bids fair to be a formidable rival and competitor of the Bell Company, inasmuch as the new company propose, we understand, to make a reduction in price to \$60 per year, instead of \$100 per year, the present figure for the Bell Company's service. It is given out as the intention of the new company to place their wires underground, and as some of the same parties who are interested in the new Telephone Company are also interested in the Conduit Company, it is believed that the underground system will be carried out, as the Conduit Company have already laid a number of miles of conduit, it is apparent that in the event of the proposed "underground wire bill now being discussed at Jefferson City becoming a law, the new Telephone company would have a great advantage in being in shape to comply with the law first, thereby greatly benefitting themselves as well as the public, and also conferring a great favor upon those of our citizens whose æsthetic tastes have so long been shocked by the unsightly overhead wire system now in use.

The National Electric Light Convention at St. Louis.

The coming convention, to be held in this city commencing February 27th, promises to be such an one as will be a credit to our city, and, we hope, will also give pleasure to and be appreciated by all those who participate in its workings.

St. Louis is justly famed for its great conventions, and, as the details for this one are in the hands of the proper parties, there is not the slightest doubt but what the St. Louis Electrical Convention will be a grand success in every respect.

We will endeavor to keep posted on all that is going on at the convention, and promise our readers that in our next issue they will find not only a gist of the proceedings, but full reports from the most interesting papers that are to be read.

The Incandescent Lamp Situation in St. Louis.

Our "Local Hustler" took a run about town one day this week to learn if there was anything new regarding the incandescent lamp question. Calling at the Columbia Lamp Factory, it was found that the manager, Mr. J. H. Rhotenhamel, was in Boston watching the outcome of the suit of the General Electric Company against the Beacon Lamp Company, of Boston, as the result of that suit will have a bearing on the course to be pursued by the Columbia Company in the suit of the General Electric Company against them, which is set for the latter part of this month.

The Columbia Company are inclined to believe that the Beacon Company are going to make a strong fight on the evidence produced by Henry Goebel and others of New York City, to the effect that the lamps as made by Goebel prior to the Edison lamp do actually anticipate the Edison lamp in all the essential features, and will render the Edison lamp patents null and void, thereby giving an open field for the manufacture of the incandescent lamp.

At the office of the American Lamp Factory, on Pine street, all the officers of the Company were found "resting on their oars," as it were, quietly awaiting further developments as to the fate of the Beacon Company.

The Missouri Electric Light and Power Company, of this city, one of the largest alternating incandescent lighting stations in the world, and operating the Westinghouse apparatus, have shown by their good business foresight, and the precautionary measures taken, that they did not intend to get left by not being able to supply their many customers with lamps. Realizing the disaster that might have befallen them in the event of the Westinghouse Company being knocked out on the lamp suit, they quietly started in buying lamps before the "injunctions" were served on the numerous lamp factories and laid in a stock of lamps sufficient for a two years' run. "There are no flies on the Missouri Company," you bet.

The Municipal Electric Light and Power Company, of course, are right in line on the lamp question, for by reason of their close connection with the Fort Wayne Company and the Thompson-Houston Company they will now be taken care of by the General Electric Company and so have nothing to fear, no matter what turn the lamp suits may take.

A call at the several electrical supply houses elicited the information that although they did not have any large stocks of lamps on hand, yet they were able to fill all orders thus far without any inconvenience whatever.

So it would seem that there is no immediate danger that any of the people of St. Louis will be obliged to give up the use of the bright and cheerful incandescent lamp on account of lamp suits here or elsewhere.

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the equities of the case and the moral rights of the public in the matter. This paper will alone make the session of the association here historic.

The St. Louis Electric Club.

The St. Louis Electric Club is to be congratulated on having passed the centenary mark in membership.

With over 100 members it became necessary to enlarge their club rooms by the addition of another spacious apartment.

At this rate of increase a magnificent club house looms up in the near future that will rival the home of the famous Calumet Club of Chicago.

The St. Louis Electric Club's preparations for the reception of the National Electric Light Convention are nearly completed and are on a magnificent scale.

Painting by Machinery.

Nearly all the trades have had to contend with labor-saving machinery. The cigarmakers and the printers have had to grapple with the question, and now comes the painter's turn. A painting device or machine has been used, it is claimed, with great success on the World's Fair buildings. It consists of a small air compressor operated by an electric motor. Twelve parts of air to one of liquid paint are drawn into the machine and discharged at a pressure of about twelve pounds in a steady stream. The paint is put on with a hose and is spread much more evenly and economically than could possibly be done by hand. The machine will do the work of several men.

Edison-Westinghouse Litigation.

[Special from Pittsburg, Pa.]

The Westinghouse and Edison Electric Companies have again locked horns in the United States District Court. The suit was entered by the Edison Co. against their Pittsburg rival for alleged infringement claiming that the new Westinghouse lamp is an infringement of the Edison patent. The case is one that may take years to decide. In the mean time the Westinghouse Co. will continue to manufacture their new lamp.

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unions I would say, come down a peg. Do not run away with the idea that your city or union is supreme. Only in unity is there strength. This does not mean a single city or state but the world, if possible.

Hoping to hear of good results in organizing and furthering the electric trade I remain till next issue.

Fraternally yours,

HENRY MILLER,

Grand President.

Jersey City, N. J., Feb. 8, 1893.

The following unions have the heartfelt thanks of the boys in New Haven for the prompt manner in which they responded to their appeal for aid:

No. 34.....	\$ 27 50
" 44.....	10 00
" 20.....	6 00
" 31.....	12 50
" 3.....	5 00
" 36.....	22 95
" 32.....	6 35
" 18.....	12 50
" 35.....	40 00
" 38.....	15 00
" 16.....	10 00
" 43.....	10 00
" 5.....	5 00
N. B. E. W.....	50 00
Total.....	\$232 80

PERSONAL.

Henry Miller, G. P., is at Jersey City.

P. J. Fleming, 5th G. V. P., reports business good in the Northwest, and will take a trip to Sioux City and organize a union there.

F. J. Roth, 2nd G. V. P., has been to Omaha this week in the interest of the B., and says that No. 22 will be all right in the future.

Little John Dunn, formerly of Cleveland, now of the United States, writes that the B. is booming in his district, and that No. 21 will be the banner union of the B. The boys can expect to be royally entertained when they meet in the Forest City next November.

John Allen, 6th V. P., reports business fair in his district. No. 16 is steadily increasing in membership.

P. F. Healy, 1st G. V. P., is a papa, but we are sorry to hear that the baby—a girl—is not expected to live.

A Watch that Speaks.

It is said a watchmaker of Geneva, Switzerland, named Casimir Livau, has just completed a watch which, instead of striking the hours and quarters, announces them by speaking like the phonograph. The mechanism of the watch is based on phonographic conditions, the bottom of the case containing a photographic sensitive plate which has received the impression of the human voice before being inserted in the watch.

The disk has forty-eight concentric grooves, of which twelve repeat the hours, twelve those of the hours and quarters, and twelve more those of the hours and second and third quarters. If the hand on the dial shows the time to be 12:15 o'clock, one of the fine needle-points of the mechanism crosses the corresponding groove and the disk, which turns simultaneously, calls out the time, just as the phonographic cylinder. The lower lid of the case is provided with a tiny mouthpiece, and when the watch is held to the ear the sound is all the more plain.

Pinkertonism.

The report of the Congressional Committee on the Homestead trouble has been presented to the Senate. The committee found that even the proprietors of the detective agencies admitted that the presence of the so-called Pinkertons at a strike, served to unduly inflame the passions of the strikers and the employment of detectives in the guise of mechanics, was an utterly vicious system, responsible for much of the ill-feeling and bad blood displayed by the working class.

The committee also expressed the opinion that if firms and corporations would discontinue the employment of armed men on occasions of threatened or existing strikes, their interests would be better served. The following conclusion was reached by the committee:

1. Rights of employers and workmen are equal.
2. Employers have an undoubted right, provided they fulfill their agreements, to employ and dismiss men at pleasure.
3. Workmen can legally organize for mutual protection and improvement.
4. When dissatisfied with wages or hours they should attempt to arbitrate.
5. Failing in this they have a right to discontinue work, either singly or in a body.
6. Having discontinued, they have no right, legal or moral, by force or intimidation, to keep others from taking their places, or to attempt to occupy, injure or destroy the property of their employers.
7. In all controversies, arbitration having failed, reliance should be placed upon the power and adequacy of the law.
8. Whether assumedly legal or not, the employment of armed bodies of men for private purposes, either by employers or employees, should not be resorted to, and such use is an assumption of the State's authority by private citizens.
9. States have undoubted authority to legislate against the employment of armed bodies of men for private purposes; but the power of Congress to so legislate is not clear, although it would seem that Congress ought not to be powerless to prevent the movement of such bodies from one State to another.

In conclusion the committee says that its investigations have led it to conclude that the fault is not wholly on one side; that middle ground seems to be in the direction of arbitration. Without making any recommendations, but pleading for arbitration, the committee closed its report as follows: "To that end we bespeak the co-operation of all patriotic citizens, and your committee will welcome any legislation which will tend to secure to the laboring man his every rights without depriving his employer of his, for both are guaranteed by the constitution and laws of the land."

The Electrical Trades Union of Great Britain.

It may be news to many of our readers to hear that the electrical workers of Great Britain are organized. The Electrical Trades Union has twenty-eight branches and about 2000 members. It is very much like the N. B. E. W. in its general makeup. The different branches into which the electrical trade is divided run about the same as here, although some of the names seem a little odd to us. In a recent letter the General Secretary says: "I am anxious to open correspondence with the General Secretary of the electrical trades in America. I think it is our duty to link our organizations together for mutual aid and protection. Therefore I want to apprise my fellow-workers in America with the progress we are making, and in return to be kept informed of the progress of our cousins across the sea." A. J. Walker, 19 Claude Road, Peckham Se., is General Secretary, and Thos. Cannon, Pullen Buildings, Benton Place Se., is General President.

The first commercial electric lighting plant installed by the Edison Company and put in operation in the hands of outside parties, was on board the steamer Columbia. The plant was started on the night of May 2, 1880.

"Sparks" From Our "Live Wire."

The only fluid that did not freeze during the late cold snap—the "electric fluid."

"Electric currents" ought to be awful good for a cake—they would make it so "light," you know.

No wonder that linemen are so cold—they are continually going to the "poles."

"I felt as if I was full of needles," said the boy who touched a live wire. It is "needless" to say that he had good "grounds" for his remark.

"Have you seen Mike?" said our office boy to the editor the other day. "Mike who?" asked the editor as he quietly looked up from a paper. "Mike A," (mica) said the office boy, and he shot out of the door before the editor could press the button of the "electrical paralyzer."

"You two are like commutator brushes," said Spriggins to his daughter and her affianced the other night. "Why, papa?" she asked, looking up innocently. "Because you are always sparking," he said with a merry twinkle in his eyes.

Linemen have a great deal of affection shown them, for they have "arms" about them even while at work. See?

A dynamo and a farmer both produce "currents," but not in the same kind of a "field."

"Clear the track," said an electric motorman, to a gripman on a Broadway cable car one cold day this winter. "I can't do it (conduit) you know; there's lots (slots) of trouble here, for I am froze fast," said the gripman in reply.

"Out of sight"—some of the city arc lamps during the sleety weather we had a few nights ago.

"Difficulties are meant to rouse, not discourage."—Channing.

Wise men ne'er sit and wail their loss, but cheerily seek how to redress their harms.—Shakspeare.

"That wrong is done us also,
And they are slaves most base,
Whose love of right is for themselves,
And not the human race."—Hazzin.

Statutes are mere mile-stones, telling how far yesterday's thought had traveled; and the talk of the sidewalk to-day is the law of the land. With us law is nothing unless close behind it stands a warm, living public opinion.—Wendell Phillips.

Violence ever defeats its own ends. Where you can not drive you can always persuade. A gentle word, a kind look, a good-natured smile can work wonders and accomplish miracles. There is a secret pride in every human heart that revolts at tyranny.—Hazlitt.

It is an old saying that charity begins at home; but this is no reason it should not go abroad; a man should live with the world as a citizen of the world; he may have a preference for the particular quarter or square, or even alley, in which he lives, but he should have a generous feeling for the welfare of the whole.—Cumberland.

Mrs. Mary Hanlon, widow of John F. Hanlon, a lineman formerly in the employ of the Bell Telephone Co., who was killed Jan. 2, 1891, on a pole on Olive St., by coming in contact with a municipal electric-light wire, has been awarded \$560 damages against the Municipal Co. This is the first judgment of the kind rendered in the St. Louis Circuit Court.

Death Claims Approved and Paid.

Paul Patrick of No. 1, St. Louis; A. C. Berry of No. 1, St. Louis; Mrs. Elizabeth Battley, wife of William Battley of No. 10, Indianapolis; J. Heyer of No. 4, New Orleans.

CLAIMS REJECTED.

J. H. O'Malley of No. 24, Minneapolis. (Not a member for the length of time required by the constitution.)

CORRESPONDENCE.

[The Press Secretary, though an officer of the Local Union, is really a resident correspondent of the *ELECTRICAL WORKER*, and should keep his paper thoroughly posted on all matters pertaining to the electrical industry in the vicinity he represents. New plants, extension of old ones, new electric roads, state of trade, new ideas, electrical novelties and accidents are a few of the topics to report on. Please notice that the minutes of the meetings are not required, except the report of new officers, and such matter as may be of general interest to all members.]

Danger of Line Work.

ST. LOUIS, MO., February 7, 1893.

EDITOR *ELECTRICAL WORKER*:

There are but few who realize the dangerous position of a lineman while at work on wires of high voltage. He climbs poles carrying a perfect net-work of wires, knowing that if he comes in contact with any of them the result will be almost certain death, either from the current or the sudden stop at the foot of the pole, or both. There are in St. Louis, and probably in all cities, linemen who have had a little experience with a grounded wire or a short circuit of high voltage, but the great majority of linemen who come in contact with such wires are, let us hope, singing with the angels or climbing golden poles when the venal coroner's jury decides death by accident and exonerates the company.

There is great difference of opinion as to what an electric shock feels like. Some say that the revolutions of the armature of the dynamo can be distinctly felt through the system; others say the surroundings look as green as the placid waters of the ocean.

St. Louis is undoubtedly the most dangerous city in the United States for a lineman to work in. The list of fatalities is a long one. Let us hope that each member of the Brotherhood will do his work in such a manner that no blame will rest on him when the next accident occurs. The members should also see that they keep their dues paid up so that they and their families will be entitled to all the benefits of the Brotherhood should an accident occur, which is liable at any moment.

A LINEMAN.

MILWAUKEE, WIS.

MILWAUKEE, WIS., February 5, 1893.

Special Correspondence.

No. 2 is getting along very nicely in a quiet way. Although not as large a union as many I see in the journal, still I am proud to say it is made up of a fine body of men, and we have made a grand success of everything we have taken in hand.

We held a prize masked ball on the 7th of January and the 600 or 700 that visited our hall enjoyed themselves thoroughly and it was quite a financial success.

No. 2 is proud of her number and will do all in her power to advance the Brotherhood. We have adopted a sick benefit and have our own lodge doctor. We have had several cases of sickness last year and paid out considerable for sick benefits, but are in a flourishing condition. We held a meeting on the 1st inst. and initiated six new members—all good men.

On account of moving to our new hall we had to change our meeting night to the first and third Wednesdays of each month. We are now located at Heim's hall, 526 Chestnut, and have very comfortable quarters.

No. 2 is jubilant over the grand success the brotherhood has made in general and hope the good work will continue.

Fraternally,
F. W. SMITH,
Recording Secretary.

TOLEDO, O.

TOLEDO, O., Feb. 6, 1893.

It gives me the greatest pleasure to act as correspondent of the *ELECTRICAL WORKER*, and though I am unable to contribute electrical subjects polished in fine rhetorical language, yet I shall give all current events and items that may be of interest to the craft and general public, in plain English. As a paper the *E. W.* should and will receive the cheerful support of every member of the Brotherhood. Through its columns we can help and educate one another and make it a medium to express our views on all electrical subjects, which we have learned by hard and dangerous experience and which enables us to excel that *know-it-all-electrician, the college bred theorist*.

The *E. W.* may feel assured of the cheerful support of No. 8, and its officers and members give sincere thanks to the editor for the energy in putting the paper before the public.

No. 8 is moving along under very adverse circumstances, as we have lately had lots of trouble with the electric companies.

Toledo, as our reports to the national convention showed, received the lowest wages of any Local in the Brotherhood. On the 10th of December last we adopted a scale of wages and presented it to the companies. To this they paid no attention and indignantly refused to recognize us as a Union, with the exception of the American District Company, who promptly signed the scale.

Chagrined with our treatment by the companies and the wages we were receiving, we left their employ. This action caused the city to be left in darkness for about ten nights, when they were enabled to hire thirty-five electrical scabs—San Francisco furnishing four of them. With the aid of the mercenary force from Chicago, they succeeded in starting their plants; but the service is so poor that the citizens and press are raising such a howl that they may be obliged to come to time. But even if they do not, their contracts will run out in a few months and the city intends putting in its own plant, so we will yet come out on top.

Fraternally,
OWEN E. MCMAHON,
Press Secretary.

INDIANAPOLIS, IND.

INDIANAPOLIS, IND., February 1st, 1893.

Local Union No. 10 met in their hall, 33½ South Illinois street, Monday evening, January 30. Meeting opened by President French. All officers present with a good attendance of members. Officers reports referred to a committee. One candidate was initiated with the usual ceremonies. One trustee and two delegates to C. L. Union were elected. Brother Otis Porter was reported sick and Brother Williams is still laid up for repairs.

Considering the weather there is an unusual amount of electric work being done here. The Indianapolis Light and Power Company are contemplating laying something over seventeen miles of underground cable, both incandescent and arc. Considerable incandescent work is now going on here, the principal part of which is done by the Hoosier Electric Company of this city. There is also some outside company here making quite extensive changes in the Deaf and Dumb Asylum plant. There is no demand here for workmen, but those that are here seem to be kept busy.

As you have probably heard, we made a demand to the Legislature through the Central Labor Union and their legislative committee for a state wire inspector, but I guess some of our lawmakers have quite forgotten some of their last campaign speeches. One of our State representatives even wanted to make it a law that it be a misdemeanor to discharge a workman because he was not a union man. They should and will be remembered at next election.

Our meetings are on the first and third Monday evenings of each month. Visiting members always welcome. Brothers of our Local unite with me in wishing the *ELECTRICAL WORKER* much success.

Fraternally yours,
D. A. GREENWOOD,
Press Secretary.

EVANSVILLE, IND.

EVANSVILLE, IND., Feb. 7th, 1893.

Local Union No. 12 was called to order by President R. Wright. Minutes of last meeting read and approved. Treasurer E. S. Masters reported amount on hand for month of January and it was referred to the trustees, W. H. Ernst and Lawrence Biggs. The committee on entertainment made a report and the union will give their ball at Evens' hall April 6th. The member selling the most tickets will be awarded a handsome pair of nickel-plated spurs, piers and connectors. Committee appointed to wait on the different companies in regard to wages reported that they would receive an answer as soon as possible. The telephone refused to pay union wages and the boys walked out.

Brother Harvey, on the sick list for the past two months, is reported mending slowly.

Brethren of our Local Union unite with me in wishing the *ELECTRICAL WORKER* a phenomenal success.

Fraternally,
W. H. ERNST,
Press Secretary.

CLEVELAND, OHIO.

CLEVELAND, OHIO, February 5, 1893.

Yesterday I received eight copies of the first issue of the *ELECTRICAL WORKER*—seven of which I distributed to those most interested, as I suppose was your intention in sending them. It would be folly or vanity, or both, for me to say anything in its praise. It speaks for itself in stronger language than my limited knowledge of words can command. That it is far above my expectation suffices me. But looking a little into its future, I cannot refrain from making a prediction that it will pave the way and make the rough places smooth for many an organizer. Through it workmen of our craft who are not yet with us will see that the Brotherhood is not a dream, a passing shadow nor a local enterprise, but that it is an organization founded on principles beneficial to the working class in general and the electrical worker in particular; that its infant days are past and now it is full of youthful vigor, with at least a few jewels of victories won, that proves its usefulness beyond a doubt. With the Brotherhood in the good working condition it is and the help of the great paver (the journal), this new year of 1893 will be known as the year of the first boom in the history of our organization.

Fraternally,
A. M. RYAN.

Detroit, Michigan.

We congratulate the *ELECTRICAL WORKER* on its appearance and general make-up. The first number is very creditable to its editor-in-chief, and should result in much benefit to the N. B. of *E. W.* May it go on in the line in which it has commenced and educate our men in their work until many of the mysteries of the business will become known to countless thousands.

Treasurer Byrne, of Local Union No. 17, has been appointed chief operator of this point by the Long Distance Telephone Company, upon recommendation from the Bell Company, with whom he was for some years.

Recently about thirty armature winders of the Detroit Electrical Works made a demand for increased pay, and, probably fearing a strike, the company granted the demands before the movement went too far to cause any trouble. This company employs about 350 hands and is busily engaged at present in fitting out many of the Detroit Citizens' Street Railway lines with electricity.

Comptroller Black is advertising for bids for city lighting, from July 1st, next. At the same time Mayor Pingree is getting data as to cost of lighting in cities where they own their own plant. A bill has been introduced at Lansing authorizing the city to own and operate its own plant. Some idea why the electric lighting companies oppose such measure may be had when it is stated that the company at present doing the lighting receives \$11.33 per month for each arc lamp, of which they have about 1300 in use on their contract. A three years' contract therefore represents considerable money.

REX.

FEB 1893

KANSAS CITY, MO.,

Union No. 18. February 17, 1892.

Editor ELECTRICAL WORKER.

We had a discussion on the subject of payment of dues, and would like to have it answered through the ELECTRICAL WORKER. The by-laws of our local reads: "The monthly dues shall be fifty cents, payable monthly, in advance." It further states: "Any member two months in arrears shall stand suspended." Now, the question came up: If a member failed to pay dues in January, and did not pay on the first meeting night in February, would he stand suspended, according to our by-laws, simply because it states the time to pay, which is in advance on the first of each month. I decided that he would be suspended on the first meeting night in February. Others thought that the member would not be suspended until the first of March, making the time 60 days.

The members of the brotherhood should feel proud of the ELECTRICAL WORKER, and I hope all locals will try and sustain it by paying all assessments promptly, so that the publishers may never be embarrassed on account of funds to carry on the good work.

J. J. J.

[Answer. The members of Union No. 18 can probably decide best the meaning of their by-laws. This matter is covered by Art. X Sec. 1 of the national constitution, which reads: "Any member indebted to his L. U. or the B. for any sum equal to two months' dues shall be considered in arrears, * * * and when in arrears to the amount of four months' dues shall be suspended." As this includes dues, fines, and assessments, and if the regular monthly dues are fifty cents, he would be suspended when he owed \$2.00, whether it was one month or four months.—Ed.]

WASHINGTON, D. C.

Regular meeting called to order by President Metzel, ably assisted by Bro. James Gorman, as Vice-President. Minutes of previous meeting read and approved. Brothers Malone, Metzel, Gilbert, Leach and Deffer were elected delegates to the Federation of Labor. On motion, it was agreed that a Standing Committee of three be appointed to arbitrate with employers in case of trouble. The Financial Secretary tendered his resignation on account of working at nights, and therefore being unable to attend the meetings. On motion, the resignation was accepted and a candidate was nominated in the person of Bro. P. A. Deffer, who was elected unanimously, and was installed by President Metzel.

Fraternally,

W. W. GILBERT,

Press Sec.

JERSEY CITY, N. J.

LOCAL UNION NO. 31, OF JERSEY CITY,

February 6th, 1893.

MR. J. T. KELLY,

DEAR SIR:—THE ELECTRICAL WORKER was received and highly appreciated by the boys, and, as we have a paper of our own now, there is no excuse for not informing you of the movements of Local Union No. 31.

Our Union consists of sixty members, of whom Thomas Watson, our president, is an able and untiring worker for the cause, always willing to assist a brother in distress. Thomas L. Jones, vice-president, is a man who when he rises, talks, knows what he is talking about, and, with the assistance of his raven black whiskers, can command the attention of even that terrible kicker, Brother Wichman.

Financial secretary, John Speicher, is a quiet, unassuming gentleman, ever ready to accept dues.

Recording secretary, Wm. Dooley (formerly press secretary), whose capacity for mashing is unlimited, finds a little time occasionally to pay his respects to the Brotherhood,

Inspector, Nat. Osborn, is a regular attendant at our meetings. Our treasurer, John Dawson, is a solid, sensible man, always ready and generous to a degree.

Our trustees: John Trumbull is extremely delighted over an incident which occurred on January 23d, in the form of a ten-pound boy. Thos. Sweeney, who will not have anyone interfere with his rights as a trustee, and last, but not least, is Clayton Ford, an old-timer, who knows his business thoroughly.

At a meeting held on Friday evening, February 3d, at Kelly's Hall, one candidate was initiated and a lengthy address was delivered by our eloquent Grand Vice-President Peter F. Healy, on the good effects acquired by the sobriety of all brothers. He also drew up a set of by-laws, which were unanimously adopted.

Business is at a standstill here, there being five brothers idle, but they will keep away from New Haven. I remain,

Fraternally yours,

F. J. ANDERSON,

Press Secretary.

Union No. 33, Newark, N. J.

The first annual ball of the National Brotherhood Electrical Workers Local Union No. 33, which was held in Casino hall on Friday, January 20th, was a success in every respect.

The music was furnished by Prof. Nichols.

Floor Manager I. G. Dunn and Miss Brittan led the march. They were followed by Charles Kummel and Miss Kittie Price. John Workman and Miss Maggie Boyle and about sixty other couples.

Large delegations of electrical workers from New York, Jersey City and Brooklyn unions were present.

The committee in charge were:

Arrangements—Wm. Titus, Wm. Whitehouse, J. Havey, Will Rosseter, W. Grogan, A. C. Peters, Wm. Teed, J. Connors, W. Clancy, W. J. Curtiss.

Reception—J. H. Horter, L. F. Van Orden, P. Logan, Tip Lewis, J. Durkin, Geo. McVey, G. Starbird, J. Reid, F. Wustlich, E. Jockas, G. Kern.

We are very sorry to state that two of our brothers are laid up for repairs.

On January 27th George McVey, a lineman and brother employed by the N.Y. & N. J. Tel. Co., had his ankle broken while running new lines through Elizabethport. The accident was caused by the pole he was working on breaking off and throwing him heavily to the ground.

The Telephone company have taken no action in the matter as yet.

The union appointed a committee to investigate Brother McVey's case, with power to draw on the treasury for necessary funds.

Brother Charles Borden, while trimming, during the recent cold weather, had several of his fingers very badly frozen and it was found necessary to amputate one of them. But as Brother Bardon is a hustler we expect to see him around again in a very short time.

Of all our members the prominent features of Brother Lewis are to be noticed first of all, "as he is a jolly good fellow" and as a singer has few equals.

The progress of Local Union No. 33 has been very satisfactory and we are continually adding new lights to our main circuit.

The brothers are well pleased with the ELECTRICAL WORKER and wish it a grand success.

WILL ROSSETER,

Press Secretary.

ROCHESTER, N. Y.—Rochester was visited with a very heavy sleet storm and at some points there was thirty miles of wires down. This caused so much extra work that our correspondent from this place is excusable for not sending his usual letter.

ALBANY, N. Y.

In the Social Swim—The First Ball a Grand Success

Bleeker Hall was the scene of an exceedingly pleasant event last evening, the occasion being the first grand annual ball of the Local Union No. 35, of the National Brotherhood of Electrical Workers of America. Delegations from adjacent cities were present and the ball room was crowded to its utmost capacity. The dancing opened with a grand march in which over one hundred couples participated, and was led by Miss S. Remalds and Mr. O. F. Dooney of Troy. The dancing order contained thirty-four numbers, and it is needless to say that sociability reigned throughout. The officers of the Union are: M. J. Cellery, President; J. A. Carleton, Vice-President; O. F. Dooney, Financial Secretary; J. Wiltse, Recording Secretary and W. R. Carr, Treasurer.

The floor committee consisted of O. F. Dooney of Troy, chief, and M. J. Cellery, assistant chief. The floor directors were: Geo. A. Allen of Troy, George J. Phillips, S. W. Williams, H. J. McChesney, Charles Snyder of Troy, Thomas Frazier, D. A. Lapette, W. R. Carr, C. R. Pearl and J. J. O'Brien.

ALBANY, N. Y.

ALBANY, N. Y., February 6, 1893.

Everything pertaining to No. 38 is looking well. Grand President Miller was here last month and made a fine address that was well appreciated by all members of the Union.

At our last meeting the following officers were elected for the ensuing year: M. J. Cellery, president; J. A. Carleton, vice-president; O. F. Dooney, financial secretary; J. Wiltse, recording secretary; W. R. Carr, treasurer; C. F. Hammond, press secretary. Trustees—G. A. Allen and W. J. Foley, Troy, and J. J. Denn, Albany.

Our ball panned out a great success financially and enjoyably.

Fraternally,

C. S. HAMMOND,

Press Secretary.

CHICAGO.

FEBRUARY 10, 1893.

Trade is fair in this city considering the season of the year. The Orme, the Cornish, and the World's Fair Construction Companies are hiring about all the men they can get, and there is a demand for Union inside wiremen.

I notice in last issue that Bro. Dillman of No. 34 comments on the length of term of office; I heartily agree with him that a six month's term is not long enough as it takes nearly that time to get thoroughly posted on the duties of the office. It is progressing rapidly and has raised the initiation fee to five dollars.

A large number of cars, intended for the intramural elevated road, have arrived at Jackson park and are stored in the southwest corner of the grounds. They are odd-looking vehicles, much unlike those generally used on surface railroads. The cars come from the works of Jackson & Sharp, Wilmington, Del., and are 50 feet long, 8 feet wide, and built to accommodate ninety-eight passengers. The seats are arranged as in summer cars, across the width. Each car has seven doors on either side and a colored canvas curtain running in a continuous line from end to end. They are handsomely decorated and each bears in letters of gold the single word, "Intramural." One lever only is used to open all the doors, which slide back instead of turning on a hinge.

The cars will be operated by electric motors and each train of four cars will have about 300 horse power. The current will be supplied by a wire placed between the rails. The brake which is a modern air pattern, is supplied by a combination motor and pump carried in the cab with the engineer. The road when fully equipped will be capable of carrying 8,000 per hour each way.

Jackson park will be a blaze of light when the fair is opened at night, the arrangements for

lighting both grounds and buildings being very comprehensive and complete. But there will be no unsightly and dangerous poles and wires. Underneath the surface of the park and connecting six of the great buildings is an underground passage, through which during the exposition will go the electric power which is to drive all the machinery and furnish all the lights outside of machinery hall. Telegraph, telephone, and fire and police wires will also follow this passage. This subway starts from near the center of machinery hall annex, runs east 825 feet, and, turning, passes to the east of the administration building to the south end of the electricity building. For this distance it is a double conduit, separated by a substantial partition. Each side is 8 feet 4 inches square. The right conduit contains wires leading to the manufactures, government, and fisheries buildings; the left subway conveys wires to the mining and electricity buildings. At the south end of the electricity building the two branches turn east and west, the west branch running to a point opposite the southeast corner of the mining building and runs north under the floor. The east branch strikes the canal at the bridge, where it stops short. It is taken up on the other side, however, and runs to the southwest corner of the manufacturers' building. Here it turns north and runs the full length of the great structure close to the west wall. Here it turns east to the center of the building, and again turns north through the center of the government building until it strikes the canal at the bridge. On the other bank the last section begins, terminating under the south end of the fisheries building.

The total length is 5,622 feet, of which 1,822 feet is a double subway. Entering the passageway under the floor of machinery hall annex, the visitor finds plenty of light from the glowing incandescent burners which workmen are using while stringing the wires. Long rows of cross arms are fixed on ceilings and walls, upon which are fixed the glass insulators for wires. The arrangement will accommodate 240 wires on each side and 480 wires in each subway. In addition to these all the telegraph, telephone, and fire-alarm wires will be arranged along the floors. Manholes at frequent intervals insure ventilation. Workmen are now busy stringing the wires, which vary from big lead-covered cables to a single insulated wire. All these wires start from machinery hall, where the great electric plant will be stored. The wires will cross the two bridges at the canal in an ingenious manner. From the last cross arms in the tunnel they will spread in fan shape to four sections of cross arms under the bridge floors. From the insulators at each end the wires will cross just under the joists and pass in a reverse manner again into the subways. The arc-light machines to be used include twenty standard machines, sixteen Brush machines, fourteen Fort Wayne machines, and ten Western Electric machines. The power generators are thirteen in number. Incandescent used throughout the park will be furnished by the Westinghouse machines, of which ten will be used. The various dynamos vary in size from the smaller machines to the great incandescent dynamo of 10,000-light power.

P. L. R.

A High Tension Transmission of Power Plant.

A contract has just been made in Switzerland for an installation in which 365 horse power is to be transmitted to a distance of about seventeen miles, with a guaranteed efficiency of 70 per cent, by means of a direct current. The generator is to be driven by two turbines coupled direct to two Thury dynamos by means of an elastic coupling, the speed being 275 revolutions. The voltage is to be 3400. Presumably the two dynamos are to be coupled in series.

DIRECTORY OF LOCAL UNIONS.



(Secretaries will please furnish the necessary information to make this directory complete. Note that the time and place of meeting, the name of the President, the names and address of the Recording and Financial Secretary are required.)

No. 1, St. Louis, Mo.—Meets every Tuesday evening at 305½ Olive st. D. Lafferty, President; M. A. Walsh, Recording Secretary, 315 Chestnut st.; John Hisserick, Financial Secretary, 315 Chestnut st.

No. 2, Milwaukee, Wis.—Meets 1st and 3d Wednesday at 526 Chestnut st. W. Denning, President; F. W. Smith, Recording Secretary, 377 Fifth st.; E. Talbott, Financial Secretary, care of 377 Fifth street.

No. 3, New York, N. Y.—Meets every Thursday evening at Clarendon Hall, 114 E. Thirtieth st. Second and fourth Thursdays are devoted to lectures and instructions on practical electrical subjects. John P. McMahon, Pres.; Lester C. Hamlin, R. S., 542 East 17th st.; E. D. Leaycraft, F. S., 283 Flatbush ave., Brooklyn.

No. 4, New Orleans, La.—Meets 2nd and 4th Wednesday at Odd Fellows' Hall. Wm. Moake, President; J. C. Bradley, Recording Secretary, Napoleon and Custom House sts.; J. J. Vives, Fin. Sec., 173 S. Basin st.

No. 5, Nashville, Tenn.—A. H. Praugue, President; J. C. Bender, Recording Secretary, 817 N. Market st.; E. W. Morrison, Financial Secretary, 308 N. Summer st.

No. 6, Memphis, Tenn.—E. J. Gray, Secretary, 20 Goslee st.

No. 7, Springfield, Mass.—W. J. Condon, President, American Hotel; J. F. Hoyt, Recording Secretary, American Hotel; F. Hyatt, Financial Secretary, American Hotel.

No. 8, Toledo, O.—Meets every 2nd and 4th Thursday at Mulcahy's Hall, cor. Monroe and Erie sts. James Carney, President; Michael Connors, Recording Secretary, 213 Everett st.; T. H. Nevitt, Financial Secretary, 1007 Bartlett st.

No. 9, Chicago, Ill.—Meets every Saturday at Plasterers' Hall, 192 E. Washington st. G. W. Elison, President; Gus Sauers, Recording Secretary, 105 Dearborn ave.; J. H. Catts, Financial Secretary, 206 31st st.

No. 10, Indianapolis, Ind.—Meets every other Monday at 33½ S. Illinois st. Sam'l B. French, President; L. E. Jones, Recording Secretary, 95 N. Meridian st.; C. W. Neal, Financial Secretary, 199 W. Maryland st.

No. 11, Terre Haute, Ind.—Meets every 2nd and 4th Tuesday at Washington Hall, cor. Eighth and Main sts. John Davis, President; Harry Bledsoe, Recording Secretary; Wm. C. Bledsoe, Financial Secretary, 424 S. Thirteenth st.

No. 12, Evansville, Ind.—Meets every Tuesday evening at Hahn's Hall, High st. R. Wright, President; Harry Fisher, Recording Secretary, 202 Clark st.; L. E. Wilke, Financial Secretary, box 266.

No. 13, Cincinnati, O.—Meets every Monday at Germania Hall, Vine st. J. C. Williams, President; J. B. Walker, Recording Secretary, 131 W. Ninth st.; C. S. Kuntz, Financial Secretary, 196 Court st.

No. 14, Bridgeport, Conn.—C. F. Callahan, President, 173 Fairfield ave.; Ed Fagan, Jr., Recording Secretary, 78 Gregory st.; W. O. Kellogg, Financial Secretary, 160 Cannon ave.

No. 15, Worcester, Mass.—Chas. Cumming, Recording Secretary, 393 Main st.

No. 16, Cleveland, O.—Meets every Friday night at Halle Bros. Hall, 356 Ontario st. J. J. Jennings, President; M. A. Plover, Recording

Secretary, 128 Huron st.; J. J. Carr, Financial Secretary, 159½ Root st.

No. 17, Detroit, Mich.—Meets every Monday at Hoffman's Hall, cor. Congress and Randolph sts. W. C. Stuart, President; I. B. Miller, Recording Secretary, 71 Henry st.; E. J. Lane, Financial Secretary, 705 15th st.

No. 18, Kansas City, Mo.—Meets every Friday evening at Industrial Hall, cor. Eleventh and Main sts. J. J. Jones, President; C. H. Adams, Recording Secretary, 215 W. Fourteenth st.; J. C. Tanpert, Financial Secretary, M. & K. Tele. Co., Sixth and Delaware sts.

No. 19, Pittsburg, Pa.—H. Hart, President; W. J. Condon, 4 Mansion st.

No. 20, New Haven, Conn.—B. A. Kaiser, President; D. C. Wilson, 157 St. John st. Recording Secretary; J. Carter, Financial Secretary, 270 Hamilton st.

No. 21, Wheeling, W. Va.—J. Allen, President, Box 111; H. T. Wyse, Recording Secretary, Hotel Wilhelm; J. F. Bonnett, Financial Secretary, 2623 Jacob st.

No. 22, Omaha, Neb.—Meets at Arcanum Hall, 1314 Douglas st. J. J. Dooley, President, 1405 Jackson st.

No. 23, St. Paul, Minn.—Joe Macauley, President; Robert Knowlton, Recording Secretary, Capital Bldg., room 25; F. A. Zimmerman, 66 Douglass st., Financial Secretary.

No. 24, Minneapolis, Minn.—P. J. Fleming, President; W. Allen, 822 Eighth ave., S., Recording Secretary; R. V. Sheldon, Financial Secretary, 1718 Wash ave. N.

No. 25, Duluth, Minn.—S. J. Kennedy, President; Phil. Bellivere, Recording Secretary, Wieland Bldg.; C. C. Miles, 28 Seventh ave., west., Financial Secretary.

No. 26, Washington, D. C.—Meets every Friday evening at K. of P. Hall, 425 Twelfth st., Nw.; R. F. Metzel, President; W. W. Gilbert, Recording Secretary, 941 Maryland ave. Sw.; P. A. Deffer, Financial Secretary, 941 Maryland ave. Sw.

No. 27, Baltimore, Md.—Meets ——— Fred Russell, President, 1408 Asquith st.; Wm. Manning, Recording Secretary, 1026 N. Front st.; J. W. Ebaugh, Financial Secretary, 107 N. Gay st.

No. 28, Philadelphia, Pa.—Meets ——— J. W. Fitzpatrick, President; H. B. Frazer, Recording Secretary, 1425 Vine st.; Thos. Flynn, Financial Secretary, 1116 Jackson st.

No. 29, Wilmington, Del.—M. H. Hannigan, President; Elwood A. Tazewell, Financial Secretary, 609 French st.

No. 30, Trenton, N. J.—Wm. Walton, President; Ed. G. Sarides, Recording Secretary; Thos. Connry, Financial Secretary.

No. 31, Jersey City, N. J.—Thos. Watson, President; Wm. Dooley, Recording Secretary, 417 W. Side ave.; John Speicher, Financial Secretary, 105 Newark ave.

No. 32, Paterson, N. J.—E. J. Clancey, President; Frank Areson, Recording Secretary, 214 Godwin st.; T. M. McAndrews, Financial Secretary, 64 Railroad ave.

No. 33, Newark, N. J.—Meets every Monday evening at No. 58 Williams st.; Thos. Leakey, President; J. S. Stiff, Financial Secretary, 38 Elm st.; W. Whitehouse, Recording Secretary, 117 Quitman st.

No. 34, Brooklyn, N. Y.—T. J. Holihan, President; R. White, Recording Secretary; L. W. Dillman, Financial Secretary, Pt. Richmond S. I.

No. 35, Boston, Mass.—Wm. M. Lannan, President; T. M. Gimes, Recording Secretary, 897 Washington st.; T. R. Melville, Financial Secretary, 95 Pearl st., Charlestown, Mass.

No. 36, New York, N. Y.—Meets weekly at Ledwith Hall, Forty-fifth st. and Third ave.; J. E. McGinty, President; L. L. Hall, Recording Secretary, 117 Leonard st.; John J. McDounell, Financial Secretary, 1632 Madison ave.

No. 37, Hartford, Conn.—Morris Cavanaugh, President; P. T. Neville, Recording Secretary; Geo. Dugan, Financial Secretary, Elec. Light & Power Co.

No. 38, Albany, N. Y.—Meets the 1st and 3rd Thursday of each month. M. J. Cellery, President; John M. Wiltse, Recording Secretary, 22 Third st., E. Albany; Owen Dooney, Financial Secretary, 4 Rensselaer st., Troy.

No. 39, Grand Rapids, Mich.—J. R. Watson, President; L. L. Henry, Recording Secretary, 97 Ottawa st.; Geo. Dierdorf, Financial Secretary, 723 Fifth ave.

No. 40, St. Joseph, Mo.—Meets every Saturday at Weidmeier & Wildburger's Hall, 623 Messanie st.; M. L. Durkin, President; Martin

Keran, Recording Secretary, 220 N. Thirteenth st.; Wm. Dorsel, Financial Secretary, 1708 Calhoun st.

No. 41, Chicago, Ill.—Meets every Wednesday at 116 Fifth ave. C. J. Edstrands, President; Chas. Osberg, Recording Secretary, 234 Townsend st.; Wm. Meecham, Financial Secretary, Crawford, Cook Co.

No. 42, Utica, N. Y.—W. B. McCoy, President; E. F. Allen, Recording Secretary, 7 Spring st.; G. P. Owens, Financial Secretary, cor. Perkins ave. and Jewett st.

No. 43, Syracuse, N. Y.—Jas. Tyrell, President; A. D. Donovan, Recording Secretary, 305 Temple st.; Chas. Beattie, Financial Secretary, 217 N. Crouse ave.

No. 44, Rochester, N. Y.—W. Carroll, President; H. W. Sherman, Ninth and Rowe, Recording Secretary, J. Desmond, Western and North ave., Financial Secretary.

No. 45, Buffalo, N. Y.—E. Calvin, President; F. Hopkins, Recording Secretary, 77 Swan st.; T. V. Thompson, Financial Secretary, 139 N. Division st.

TAKE NOTICE.

Officers of Local Unions should carefully read the following rules before writing for information:

1. Give notice at once when a change occurs in Secretary's address, or when a vacancy has been filled by the election of a new officer.
2. Consult the financial report in the WORKER every month, and if incorrect, report at once.
3. Arrange to receive any mail that may be en route to old addresses of officers, when change occurs.
4. In reporting the election of new officers, use the regular blank furnished for that purpose, and write plainly the name and address of each officer.
5. The monthly report of the financial secretary must accompany the dues sent.
6. Never fill out a report of any kind until first making it out on waste paper, then copy it on the regular report blank. This obviates alterations and scratching.
7. Always put name and address on reports and letters.
8. Send in name, number of card, age, and date of admission of each new member, as he will not be entitled to benefits until his name is enrolled on the books at the general office.
9. Report promptly the suspension or expulsion of members; also traveling cards taken out.
10. When sending money always state what the amount is for; do not leave it for the G. S.-T. to guess at.
11. All orders for supplies should be accompanied with the requisite amount of money.
12. Never send money in a letter. All remittances should be forwarded by post office money order, express money order or bank draft.
13. Unions indebted for over two months' dues are non-beneficial (see Art. XV. Sec. 5). All members are interested in this matter and should look after it closely.
14. On the expiration of a traveling card the member holding said card should pay one month's dues and receive a due card and be enrolled as a member of the Union, the same as a new member.
15. All Local Treasurers should be under bond and the same filed with the G. S.-T.
16. All receipts and correspondence from the general office should be read at the meetings.
17. Read the constitution carefully and consult it on all matters that arise for consideration.
18. Make out all reports with ink and use the regular report blanks and letter paper furnished for that purpose.
19. When admitting or reinstating members the strictest inquiry as to health must be observed. If the member is married the wife's health must also be noted.

20. Claims for benefit must be filled out in every particular, and the law in regard to their presentation rigidly complied with.
21. No claims will be allowed unless the member is square on the books. Our beneficial system would cease to be an incentive for prompt payment of dues were this law not enforced.
22. Remittance of dues is not allowed under our Constitution. The amount of the dues must be deducted from the sick benefit paid by the Local. A member entitled to benefits can not get in arrears while receiving benefits. Members, by contribution, can keep the dues of a sick or unfortunate brother, not entitled to benefits, paid up.
23. Salaried officers must pay their dues and carry due cards. When salaries are due they must present their bill, and its payment passed on the same as any other bill presented to the Union.
24. Newly-elected officers must procure all blanks, documents, etc., from their predecessors.
25. Unions shall never assume to pay the funeral expenses of deceased members until first ascertained that the claim is allowable.
26. Preserve old due cards. They may be useful for reference in case of dispute over dues, etc.
27. Members should always when attending meetings of the Union have with them their Constitution and By-Laws; also their due cards.
28. Parties making statements in reference to recreant members will be held responsible for statements sent in for publication.
29. Matter for the ELECTRICAL WORKER must reach the general office by the 10th of each month.

As we are about to open a new roll book we request all Secretaries to furnish us soon as possible a complete roll of their members since their Union was organized. Some of the Unions with a membership of 100 to 200, according to the Financial Secretary's report, have less than twenty entered on the books at the general office, and none outside of those twenty would be entitled to death benefits.

Send in the name of every member initiated since the Union was organized, even though long since suspended or expelled. This is necessary, as we must have a correct record of every member who ever belonged to the Brotherhood.

RECORD OF PATENTS.

The following recent electrical patents are reported by Higdon & Higdon & Longan, patent lawyers, 215, 216, and 217 Odd Fellows' Building, St. Louis, and 48 Pacific Building, Washington, D. C.

490,648, Electric bell, John W. Cummings, Gold Hill, Nevada.

490,663, Electric block, signal system, John Laburt, assignor of one-third to A. M. Lowry, New York, N. Y.

490,954, Manufacture of carbon filaments for electric lamps, Thomas A. Edison, Llewellyn Park, N. J.

490,839, Thermal circuit closer, Elihu Thomson, Swampscott, Mass.

490,679, Apparatus for electrically treating the ear, William A. Price, Iowa Falls, Ia.

490,678, Apparatus for electrically treating the eyes, William A. Price, Iowa Falls, Ia.

490,762, Electric circuit breaker, Edward M. Bentley, Boston, Mass.; assignor to General Electric Company of New York.

490,809, Dynamo electric machine, Robert Lundell, Brooklyn; assignor of two-thirds to E. H. Johnson, New York.

490,810, Robert Lundell, Brooklyn, assignor of two-thirds to E. J. Johnson, New York, N. Y.; dynamo electric machine or electric motor.

490,959, Coupling of dynamo electric machines in parallel, Albert Hay, London, England.

- 490,746, Jacob S. Gibbs, assignor to Perkins Electric Switch and Manufacturing Company, Hartford, Conn.
- 490,755, Connector for electrical conductors, George L. Russell, Middletown, Conn.; assignor to Schuyler Electric Company of Conn.
- 490,953, Generating electricity, Thomas A. Edison, Llewellyn Park, N. J.
- 490,753, Secondary battery electrode, Harry G. Osburn, Chicago, Ill.
- 490,841, Electroplating alluminum, George Wegner, Berlin, Germany.
- 490,840, Composition for soldering aluminum, George Wegner, Berlin, Germany.
- 490,903, Combined gas and electric light fixtures, Francis X. Gartland, Philadelphia, Pa.
- 490,641, Insulating compound, Mathew H. Devey, Chester, Pa.
- 490,046, Electric stop motion for knitting machines, Winslow M. Bell, Milton, N. Y.
- 490,992, Electric arc lamp, James Sugden and W. J. L. Sandy; assignors to C. H. Freedman, F. W. Suter and H. Wyman, London, England.
- 490,700, Electrical measuring instrument, Edward Weston, Newark, N. J.
- 490,698, Electric time indicating apparatus, Edward Weston, Newark, N. J.
- 490,699, Recording ammeter, Edward Weston, Newark, N. J.
- 490,760, Electrical measuring instrument, Edward Weston, Newark, N. J.
- 490,761, Electric signaling system, Adoniram J. Wilson, Port Chester, N. Y. and W. W. Salmon, Chicago, Ill.; assignor to Hall Signal Company of Maine.
- 490,725, Electrical, pressure indicator for steam-gauges, Edward G. Smith, San Jose, Cal.
- 490,917, Switch and safety fuse, Elmer P. Morris, Boston, Mass.; assignor to Thomson Houston Electric Company of Connecticut.
- 490,744, Electric time system, William F. Gardner, Washington, D. C.
- 490,891, Electric warming bottle, Thomas Ahearn, Ottawa, Canada.
- 491,394, Electrically reducing aluminum and forming alloys thereof, Thomas L. Willson, Brooklyn, N. Y.
- 491,457, Electrical measuring instrument, Elmer G. Willyoung, assignor to S. L. & E. B. Fox, Philadelphia, Pa.
- 49,483, Switch for electrical tram cars, Moritz Immisch, London, England, assignor to Immisch Electric Navigation and Power Company of New Jersey.
- 491,124, Arc-light carbon, James McLaughlin, Chicago, Ill.
- 491,339, Electric clock, John H. Dyson, Belleville, Wis.
- 491,313, Electric curling iron heater, Samuel B. Jenkins, assignor by mesne assignments to American Electric Heating Company of Boston, Mass.
- 491,311, Electrically heated soldering-iron, Samuel B. Jenkins, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.
- 491,312, Electrically heated smoothing-iron, Samuel B. Jenkins, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.
- 491,484, Electrically heated vessel, Samuel B. Jenkins, assignor by mesne assignment to American Electric Heating Company of Boston, Mass.
- 491,369, Electric lock, Oliver A. Moyer and H. W. Rhodes, Ogden, Utah Territory.
- 491,294, Dynamo electric machine, Gabriel V. M. A. Parrot, and A. C. Reignier, Paris, France.
- 491,426, Combined electric switch and door lock, John H. L. Holcombe, U. S. Navy.
- 491,106, Bipolar electrical machine, Thomas H. Hicks, assignor of one-half to G. F. Case, Detroit, Mich.

491,322, Electrically heated gridiron, Willis Mitchell, Malden, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.

491,320, Electric water heater, Willis Mitchell, Malden, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.

491,321, Electrically heated vessel, Willis Mitchell, Malden, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.

491,437, Electric metal-heating device, Willis Mitchell, Malden, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.

491,438, Electrically heated muffle, Willis Mitchell, Malden, assignor by mesne assignment to American Electric Heating Company, Boston, Mass.

11,303, Insulating electric conductors, Thomas E. Morford, Chicago, Ill., assignor to Enamel Insulator Company of Illinois.

491,490, Insulation of dynamo armatures, Thomas E. Morford, Chicago, Ill., assignor to Enamel Insulator Company of Illinois.

491,491, Insulated magnetic coil, Thomas E. Morford, Minneapolis, Minn., assignor to Enamel Insulator Company of Illinois.

491,726, Accumulator, William A. Macleod, Boston, Mass.

491,713, Electric head-lamp, William Maine, Brooklyn, N. Y.

491,567, Conductor for amatures, Emil Kolben, Schenectady, assignor to Edison General Electric Company, New York, N. Y.

491,568, Armature and means for supporting same, Emil Kolben, Schenectady, assignor to Edison General Electric Company, New York, N. Y.

491,666, Electric locomotive, Sidney H. Short, assignor to Short Electric Railway Company, Cleveland, Ohio.

491,667, Directly connected motor for cars, Sidney H. Short, assignor to Short Electric Railway Company, Cleveland, Ohio.

591,692, Time circuit closer, Robert H. Twigg, London, England.

491,945, Self-winding electric clock, Emil Klahn, West Hoboken, N. J., assignor to D. C. Hood, New York, N. Y.

491,560, Coulomb counter, George Hummel, Nuremberg, Germany.

491,811, Alternating current generator, Octave Patin, Paris, France.

491,695, Alternating current dynamo electric machine, James J. Wood, Brooklyn, N. Y.

491,970, Electric motor, Alexander W. Meston, St. Louis, Mo.

491,708, Electric motor and dynamo mica insulator, Charles W. Jefferson, Schenectady, assignor to E. Munsell & Co., New York, N. Y. and Elizabeth, N. J.

491,707, Electrical insulating conduit, Charles W. Jefferson, Schenectady, assignor to E. Munsell & Co., New York, N. Y., and Elizabeth, N. J.

491,829, Electric motor regulator, Joseph A. Williams, Canal Dover, Ohio.

491,874, Electric signal, Frank H. Clarke, assignor of one-half to I. H. Clarke, Springfield, Ohio.

491,531, Electrical signaling apparatus, Jacob B. Currier, Lowell, Mass., assignor to Currier Telephone Bell Company of Massachusetts.

491,532, Electric Governor for signaling circuits, Jacob B. Currier and D. H. Rice, Lowell, Mass.

491,684, Manufacture of secondary battery electrodes, Robert M. Lloyd, New York.

491,915, Electric arc lamp, William H. Akester, London, England.

491, 916, Electric arc lamp, William H. Akester, London, England.

491,603, Duplex electric arc lamp, Charles E. Scribner, assignor to Western Electric Company, Chicago, Ill.

491,604, Electric arc lamp, Charles E. Scribner, assignor to Western Electric Company, Chicago, Ill.

491,605, Cut-out for arc lamps, Charles E. Scribner, assignor to Western Electric Company, Chicago, Ill.

491,688, Switching system for telephone exchanges, assignor to Western Electric Company, Chicago, Ill.

491,561, Incandescent lamp-socket, Joseph Hutchinson, assignor to Edison General Electric Company of New York, N. Y.

491,890, Insulator, Andrew L. Johnston, Richmond, Va.

491,682, Bushing for incandescent lamp-sockets, C. A. B. Halverson, Saufus, assignor to R. B. Lincoln, Boston, Mass.

Certified copies of the drawings and specifications of any of the above patents furnished by the ELECTRICAL WORKER on receipt of 25 cents in stamps.

GENERAL NEWS.

Where Electrical Workers May Look for Work.

WAUSAU, WIS.—Will build four miles of electric road.

CANTON, O.—The Canton-Massillon electric car line will be extended six miles to New Berlin. Work will commence as soon as the weather will permit.

SPRINGFIELD, O.—The first step toward building an electric road from here to Cincinnati has been taken, arrangements having been made to build one of the links from Harshmanville to Franklin.

SYRACUSE, O.—An electric road will be built from here to Middleport, during the coming summer.

SCRANTON, PA.—The Northumberland, Bloomsburg and Scranton Electric R'y Co. will build an 80-mile trolley line between these points.

YORK, ME.—The York Light & Power Co. has been organized; capital \$100,000. It will furnish light for the town and power to hotels and motors.

ROCHESTER, N. Y.—The firm of Michaels, Stear & Co. will put in a complete electric plant in their new factory on North Clinton street. Cutting machinery will be run by electric motors, and sadirons heated by electric current.

KANSAS CITY, MO.—The Board of Public Works are considering the advisability of putting an electric light plant in the basement of the City Hall.

EVERETT, WASH.—A company has been formed to build an electric railway from Everett to Snohomish, a distance of eight miles.

SALT LAKE CITY, UTAH.—An English syndicate is negotiating to get control of the electric and gas light plants of this city. The price offered is said to be considerable over \$1,000,000.

CUMBERLAND, MD.—An electric road will be built between this city and Westernport, a distance of thirty miles. The road will take in nearly every town in Allegheny County.

ST. JOSEPH, MO.—St. Joseph will soon have a new electric street railway system.

CHICAGO.—The Chicago and Southwestern Street Railway Co. intend to build an electric road on 95th street.

GREENWOOD, MISS.—The city will erect an electric light plant.

SEDALIA, MO.—The Ilgenrutz Bros. will put in an electric plant in their new building.

DES MOINES, IA.—The Edison Electric Light and the Water Power Electric Light companies were consolidated under the name of the Des Moines Electric Company. Capital stock \$1,000,000.

The Lake Angeline mine, in Northern Michigan, has contracted to put in an electric tramway and an electric light plant at a cost of \$50,000.

NEW ORLEANS, LA. — [Special.]—The Electric Traction Company which has acquired control of a number of street railway systems, will give the time-honored mule and bobtail car a much needed

vacation, and equip the roads with the most approved system of electric cars. The change will require an expenditure of over \$6,000,000. Mr. E. E. Denniston of Philadelphia is president of the company, and R. T. McDonald of Fort Wayne, Ind., who is also president of the Municipal Electric Light and Power Company of St. Louis is a large stockholder of the new company.

DETROIT, MICH.—Sealed proposals will be received until Feb. 20th, for lighting the streets with arc lights, and the City Hall and other municipal buildings with incandescent electric lights. The contract will probably be for five years.

DAYTON, O.—The Grand Opera House will be remodeled and equipped with an incandescent electric light plant.

KEARNEY, NEB.—The Kearney Opera House Company will put in an electric plant.

SOUTH DENVER, COLO.—South Denver will put in an electric fire alarm system.

ROME, N. Y.—The Rome street railway will change to an electric system.

QUINCY, MASS.—The Quincy Real Estate Trust Co. proposes to build an electric light plant to light their hotel, and also their proposed opera house on Granite street, and they will also furnish power for the street railway companies.

LEWISTON, MONT. — The Lewiston Electric Light and Power Company has been incorporated and will proceed at once to build a central station.

FLANDREAU, S. D.—Both the City and the Indian Industrial School will soon have electric lights.

CHICAGO, ILL.—The North Side Electric Street Railway Company has been incorporated with a capital stock of \$5,600,000. It is intended to build an electric road to Milwaukee. It is proposed to complete the road within two years.

HOT SPRINGS, ARK.—Hot Springs is to have a double-tracked electric road four miles long.

SPRINGFIELD, O.—[Special.]—Hon. O. S. Kelly, president of the Kelly Manufacturing Company, has sold his patents to the General Electric Company. The price paid is said to be \$500,000. It is claimed that all electric system with overhead attachments are infringements on these patents. There is a queer history connected with the patents. A poor man in Michigan named Green was the patentee, and Mr. Kelly furnished Green with money for twenty years. Two years ago the Supreme Court of the District of Columbia handed down a decision sustaining the validity of Green's invention. Mr. Kelly finally bought Green out and has disposed of the patents at a princely figure.

GALLATIN, MO.—Electric light plant and water works contracts will soon be given out for this place.

WABASH, IND.—Wants an electric fire alarm.

PITKIN, COLO.—Pitkin is figuring on an electric light and water works.

LUZERNE, MINN.—The new shaft for the electric light is now in place and working finely.

NEW SHARON, IA.—Is contemplating the advisability of an electric light plant.

DALTON, O.—Is agitating the question of electric lights.

COLFAX, COLO.—The citizens are agitating the question of getting the town to contract with the Denver, Lakewood and Golden for electric light.

BROOKLYN, N. Y.—The Brooklyn Traction Co. has purchased the Brooklyn, Bath & West End R. R. and will operate it by electricity instead of steam.

DALLAS, TEX.—A franchise has been granted to operate a new electric railway. Fifteen miles will be built before July 1st.

WEBB CITY, MO.—An electric road will be built between this place and Cartersville, a distance of ten miles.

NELSONVILLE, O.—A company has been organized to establish an immense electric plant, to furnish light and power to all the coal mines within a radius of eleven miles. Lines will be run from the station to each mine and the current will be used both to light the mines and operate the mining machines.

FEB 1893

BRIDGEPORT, CONN.—The Pennoak-Botter Electric Light & Improvement Co., at present located at Boston, Mass., will build a large plant here.

MEDIA, PA.—The Philadelphia and Delaware County Electric R'y Co. will at once begin the construction of its line between Chester, Media and the limits of Philadelphia.

FLORENCE, COLO.—The Florence Electric Light and Rapid Transit Co. has been organized with a capital stock of \$100,000. It will supply light and power for the surrounding mines, and also construct an electric road.

COLORADO SPRINGS, COLO.—Detroit and Buffalo capitalists are preparing to build an electric railway line to the Cripple Creek towns, via the Seven Lakes, through a tunnel in the Jeff Davis group of mines. These mines are to be operated by electricity, and the mine operators as well as the Rapid Transit Co. of this city are interested. The line will be about thirty miles long.

MILWAUKEE, WIS.—The electric road to North Greenfield will be completed and in operation by July 1st.

GREENWOOD, MISS.—The Delta Machinery Co. will put in an electric plant.

EAST ST. LOUIS, ILL.—The East St. Louis Electric & Dummy Co. will build an electric freight line from Venice to East Carondelet.

HAMMOND, IND.—A new electric light plant will be erected at the corner of Hudson street and Sheffield avenue.

INDIANAPOLIS, IND.—The Indianapolis Electric Light & Power Co. intend to lay about seventeen miles of underground cable, both arc and incandescent.

NEW LONDON, O.—The Norwalk Electric Construction Co. are about to erect a plant here.

BERKELEY, CAL.—The Berkeley Electric Light Co. have about completed their new plant. The new circuit will include sixty new lights, and will take in the annexed districts of Lower and Southern Berkeley.

EFFINGHAM, ILL.—The electric light plant here is capitalized for \$15,000.

SEGUIN, TEX.—Seguin will soon have an electric plant.

GENEVA, ILL.—Will have an electric light plant in the near future.

CROWN POINT, IND.—The electric plant sold here by sheriff's sale was bought by the Thompson-Houston Electric Light Company of Chicago, for \$9000.

PETERSBURG, IND., Feb. 4.—[Special.]—The city council let a contract a few days ago for electric lighting. A fine plant will be built and both arc and incandescent systems will be used. The company expects to be ready for business by April 1.

MARYVILLE, MICH.—Is to be lighted by electricity.

CLINTON, MICH.—Work on the electric lights here is nearly completed.

WARREN, O., Feb. 3.—[Special.]—The Trumbull Electric Street Railway to Niles is progressing rapidly. Kirk, Christy & Co. have the contract for ties and Star & Bolin for distributing material.

WARREN, O.—The Peoples' Electric Co. has just been incorporated and will build an electric road from Barberton to Ravenna, passing through Akron, Cuyahoga Falls and Kent.

FREMONT, O.—At a special election held at Clyde, Monday, 6th inst., it was decided to issue bonds for electric lighting, water works and street improvements.

LANSING, MICH., Feb. 7.—[Special.]—The city of Lansing, on Dec. 1 last, purchased the plant of the Lansing Electric Light Co. for \$45,000. More machinery has been purchased and an additional mile of wire has been added and with poles, etc., will run up the plant to \$55,000.

EAST ST. LOUIS, ILL.—The Citizens' Electric Railway Co. secured from the city council a right-of-way for a double track from Collinsville avenue on Broadway to the Belt road.

WEST SUPERIOR, WIS.—The Edison Electric Co. are about to establish a branch here.

HANFORD, CAL., Feb. 2.—[Special.]—H. G. Lacey, one of the owners of the electric plant here has purchased in San Francisco a 100-horse power Reynolds-Corliss engine to reinforce the 125 Corliss engine now in use. He will also buy two dynamos of 1000 lights capacity each—making a total of 6000 16-candle lights. New buildings will be erected.

COLLINSVILLE, ILL.—W. Young of St. Joseph, Mo., James Hannerty of Chicago, J. S. P. Gordon of Collinsville, P. Gordon of Glen Carbon, incorporated a new company at Springfield last week to build an electric road from Collinsville to St. Louis. Work will commence very soon.

CHICAGO, ILL.—The Crescent Electric Light, Heat and Power Co. have incorporated with a capital stock of \$100,000. J. R. Bickerdike, T. D. Hull, and B. Johnson.

PETERSBURG, ILL., Feb. 2.—The Petersburg electric light plant will be enlarged.

ASHVILLE, O.—Negotiations are now on for an electric light plant for this place.

PORT HURON, MICH.—The St. Clair Light and Fuel Co. have let the contract for erecting their plant to J. O'Sullivan.

TOLEDO, O.—The new electric light works are rapidly nearing completion and will cost \$200,000.

JEFFERSON CITY, MO.—The Capitol City has contracted for a complete system of arc street lamps which will be completed in a few weeks.

LINCOLN, NEB.—The Lincoln Light & Power Co. people are to erect a \$150,000 plant.

MUSKEGON, MICH., Feb. 10.—The plans for the Hackley electric fountain, on Webster avenue, have reached the city; and work will commence at once. The fountain will be thirty feet high of Vermont granite, topped with copper bronze. Incandescent lights of many colors will be enclosed in a glass globe, and the effect at night will be very brilliant.

ST. LOUIS, MO.—The vestibuled car on the Lindell Street Railway system, equipped with Westinghouse motors, has given such satisfaction that the Lindell Company have given an order for 100 cars to be equipped with the late Westinghouse motors.

TRADE NOTES:

Consolidated Engineering Co. are rather new-comers in St. Louis, but are catching on in great shape. They have just closed a large contract with the Globe Shoe & Clothing Co. to put in an extensive plant, and are also fitting up plants for the Eagle Electric Co., of Columbia, Ill., the City of Fayette, Mo., and the Marion Electric Light & Street Railway, Marion, Ill.

Partrick & Carter Co., of Philadelphia, are now filling their many advance orders for their new Automatic Annunciator. This, in addition to their general electric supplies and house-goods (of which they make a specialty), keeps their very extensive plant working to its full capacity.

Dow Adjustable Light Co., of Baintree, Mass., are pushing the Dow Adjusting Ball for electric lights, and are making a great success of it. Their fusible connections and electrical appliances are also selling very rapidly.

Solar Carbon & Mfg Co., of Pittsburg, Pa., are pushed to fill orders for their Motor and Dynamo Brushes, Electric Light Carbons, soft, cored and solid, and are also manufacturing battery carbons of all shapes.

Shultz Belting Co., of St. Louis, and the rest of the earth and moon thrown in (see cut of trade mark), may not be globe trotters personally, but where their belting is not found must be absolutely beyond the pale of civilization. This week they shipped 3000 feet of belting to Moscow, Russia, and are about completing a like order for Sidney, Australia. The inhabitants (?) of the moon will be telephoning for it as soon as wizard Edison completes his new long-distance 'phone.

F. R. Harding of Washington, D. C., is a walking encyclopedia of useful and novel electrical patent reports. It is said he memorizes the numbers, dates and data of each patent. His nearness to and personal acquaintance at the Patent Office gives him easy access to its archives, and he makes good use of his opportunities.

Geo. A. Rubelmann Hardware Co., of St. Louis, are doing an extensive business in general hardware and making a specialty of electrical tools. They are selling their cornice-brace lower than any other hardware house in town. Send for a catalogue.

LESSONS FOR A YOUNG MAN'S LIFE.

"I.—Never indulge the notion that you have any absolute right to choose the sphere or the circumstances in which you are to put forth your power of social action; but let your daily wisdom of life be in making good use of the opportunities given you.

"II.—We live in a real, and a solid, and a truthful world. In such a world only truth, in the long run can hope to prosper. Therefore avoid lies, mere show and sham, and hollow superficiality of all kinds, which is at best a painted lie; let whatever you are, and whatever you do, grow out of a firm root of truth, and a strong soil of reality.

"III.—The nobility of life is work. We live in a working world. The lazy and the idle man does not count in the plan of campaign. 'My father worketh hitherto and I work.' Let that text be enough.

"IV.—Never forget St. Paul's sentence: 'Love is the fulfilling of the law.' This is the steam of the social machine.

"V.—But the steam requires regulation. It is regulated by intelligence and moderation. Healthy action is always a balance of forces, and all extremes are dangerous; the excess of a good thing being often more dangerous in its social consequences than the excess of what is radically bad.

"VI.—Do one thing well, 'be a whole man.' As Chancellor Thurlow said: 'Do one thing at one time.' Make clean work and leave no tags. Allow no delays when you are at a thing; do it and be done with it.

"VII.—Avoid miscellaneous reading, read nothing that you do not care to remember, and remember nothing that you do not mean to use.

"VIII.—Never desire to appear clever and make a show of your talents before men. Be honest, loving, kindly and sympathetic in all you say and do. Cleverness will flow from you naturally if you have it, and applause will come to you unsought from those who know what to applaud; but the applause of fools is to be shunned.

"IX.—Above all things avoid fault-finding and a habit of criticism. Let your rule in reference to your social sentiments be simply this: Pray for the bad, pity the weak, enjoy the good and reverence both the great and small, as playing each his part aptly in the divine symphony of the universe."

PROF. JOHN STAURT BLACKIE.

We are grateful to our brother electrical workers for the kind appreciation they have shown for our humble efforts and to our correspondents for the kindly words they have written us, some of which were so flattering that our modesty would not permit of our publishing them. We also thank them for the able communications they have sent in and hope in the future every City and Local Union will be represented in our columns.

The columns of the "Electrical Worker" are always open for the free discussion of any subject in which the Electrical Industry or the welfare of Electrical Workers is at stake.

FOR SALE.**ARC DYNAMOS.**

5	9 1/2	amp.	35	light, Waterhouse dys. and reg'ltr.		
1	9 1/2	"	10	"		
2	18	"	65	"	Van Depoel	no
1	18	"	12	"	"	"
1	18	"	8	"	"	"
1	18	"	6	"	"	"
1	9 1/2	"	10	"	Excelsior	"
1	9 1/2	"	8	"	"	"
1	9 1/2	"	30	"	Brush	with
1	9 1/2	"	5	"	"	no
1	9 1/2	"	25	"	Ball	"
1	9 1/2	"	40	"	West'n Ele.	with
2	18	"	20	"	U. S.	"
1	18	"	30	"	Jenney	"
2	18	"	16	"	"	"
1	9 1/2	"	20	"	American	no
1	9 1/2	"	50	"	"	"
1	9 1/2	"	40	"	Sperry	with
2	18	"	20	"	"	"

ARC LAMPS.

200	9 1/2	amp.	single	Waterhouse lamps.		
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43	9 1/2	"	"	"	No. 16.	
97	18	"	double	Jenney		
80	9 1/2	"	Brush		No. 11.	
60	18	"	single	Jenney		
43	18	"	single	Western Ele.		
200	18	"	double	Van Depoel		
45	18	"	single	"		
54	9 1/2	"	double	Excelsior		
5	9 1/2	"	single	Ball		
20	9 1/2	"	single	Sperry		
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1	96	"	300	"	"	
2	4	amp.	300	Helster	reg'ltrs.	
2	4	"	500	"	rheostat.	
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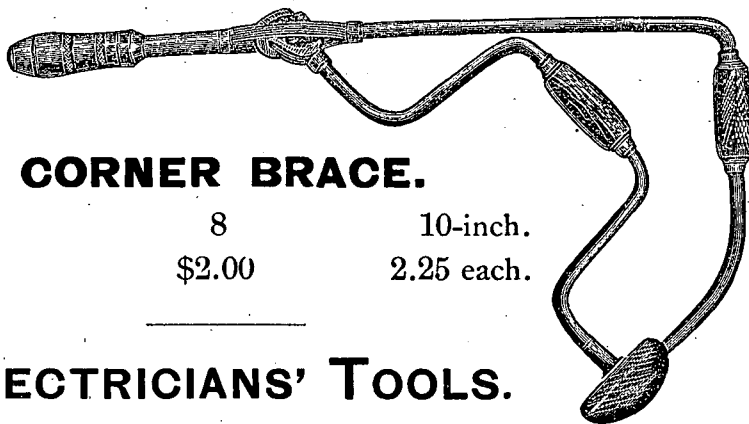
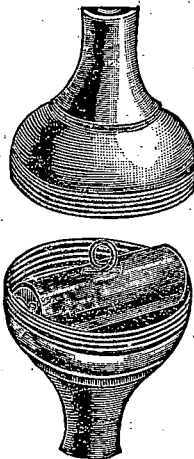
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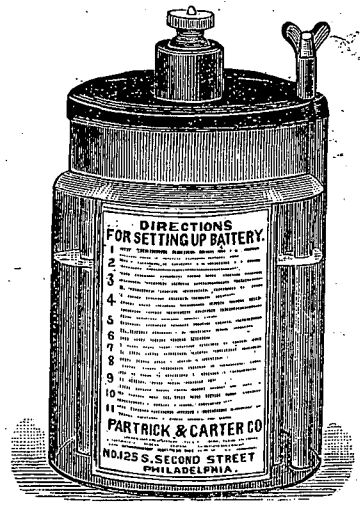
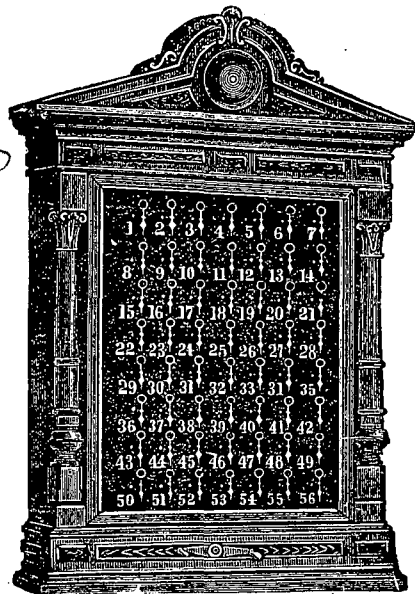
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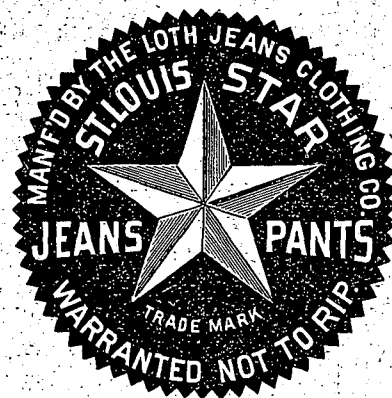


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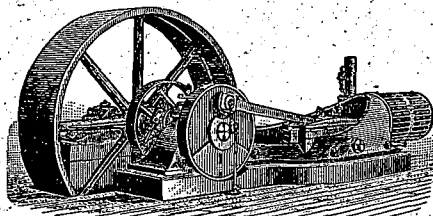
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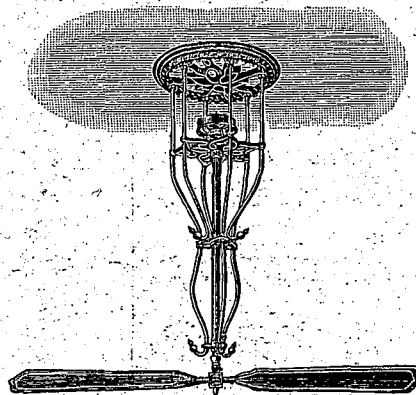
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